The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XVI. No. 402 MARCH 12, 1927 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

PAGE

EDITORIAL NOTES: A Successful Fair; The "L. and N." Process; The Late Dr. Crossley; International Chemical Leaders; The Cost of Being Governed; British Cyanides; I.C.I. Directors' Report 249
Conference of the Institution of Chemical Engineers 252
Progress of the Glass Industry 253
"The Non-Inflammable Film," by H. J. Mallabar 254
The Late Dr. A. W. Crossley: An Appreciation 255
Correspondence: "The Future of Chemists"; "C.A." Queries 259
From Week to Week 260
References to Current Literature 261
Patent Literature 262
Weekly Chemical Prices and Market Reports 265
Company News; Chemical Trade Inquiries, etc. 270
Commercial Intelligence; New Companies Registered 272

Dyestuffs Monthly Supplement: "The Dyeing of Cotton and Artificial Silk Fibres," by A. J. Hall; "Intermediates for Dyestuffs. VII—The Sulphonic Acids of Anthraquinone," by the "Consultant" ..... i-vii-xxiv

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices: Bouverie House, 154, Fleet Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London" Telephone: City 0244

A Successful Fair

No sooner is the British Industries Fair of 1927 over than the announcement is made by the Department of Overseas Trade that the Government, in view of the success of this year's Fair, have again granted £25,000 for overseas publicity for the next Fair, which will be opened in London and Birmingham on the third Monday of February, 1928. It is clear, from the decision of the authorities, that the two centres chosen this year are the best to be found, and that at each the results have more than justified the cost and effort involved in organising them. From the statement made the other day in the House of Commons by the Parliamentary Secretary to the Board of Trade, the success of the Fair this year is clearly beyond question. The actual number of buyers who visited the London section of the Fair was 74,462, of whom 1,581 came from overseas. The latter figure takes no account of a considerable number of United Kingdom agents of overseas firms who were buying on foreign account. These figures show an increase of over 25 per cent. on the corresponding figures for last year. In addition, the general public visited the Fair to the number of about 25,000 in London and 10,000 in Birmingham. No official figures are available as to the business done, but the exhibitors in all sections of the Fair have expressed themselves as more than satisfied with the actual and anticipated results.

The "L. and N." Process

THERE were several points of interest in the account that Colonel Moore-Brabazon, M.P., gave at a Savoy luncheon this week of the aims of the "L. and N." (Laing and Neilson) Coal Distillation Co., which has been formed to take over the English rights in all patents and processes owned by the Sensible Heat Coal Distillation Co. A novel point about the gathering was the absence of any appeal for money; so good is the faith of those behind the undertaking in its possibilities that the money required—a sum of about £125,000—has been all privately subscribed. Rarely, in these days, does faith take so concrete a form!

The "L. and N." process is, as our readers know, a low-temperature carbonisation system, with, however, certain distinctive features. One of the most important relates to oil. Unlike the Bergius process, which aims at the conversion of coal into oils under high pressure, the "L. and N." process extracts the oil already existing in the coal, merely leaving the coal oil-less and therefore, as the company claim, in an even more satisfactory state to be burnt than before. Unlike other systems again, the process avoids "cracking" and produces a primary oil from which all the fractions that well oil yields can be derived—petrol, paraffin, gas oil, Diesel oil, lubricating oil, and phenols in addition. The lubricating oil, for example, as tested by the National Physical Laboratory, is found to be equal to the best lubricating oils on the market, and remembering that all but 2 per cent. of the lubricating oils used in this country comes from America the importance of a new home-produced lubricant is obvious. In addition to about 20 gallons of oil per ton, it is estimated that the process will yield about 14 cwt. per ton of fuel. A large proportion of this is smokeless fuel for burning in an open grate, and it is estimated that an ample market can be found for this at 20s. a ton. What is too small to be used in this way is intended for use as pulverised fuel for steam generation. "It has advantages over pulverised coal," Colonel Moore-Brabazon confidently stated, "in this respect that it is non-explosive, is easier to grind, and burns with a shorter flame. It can be pumped in a pulverised form along pipes into bunkers, behaving in this respect like oil. It can be burnt like fuel oil under boilers, but has this advantage that it gives equal heat results at half the cost of oil. There is a large and increasing demand for its use, and we have no misgivings as to the markets open for its consumption." It is not apparently intended to market the gas produced; all this will be utilised in the distillation process itself.

The mechanism of the process is described as comparatively simple. A cylindrical retort, in its present form about 40 ft. long and 4 ft. in diameter, inclined slightly at an angle, rotates slowly. In the higher end is fed coal which slowly travels from one end to the other. This coal is met by a hot gas the temperature of which is controlled and never exceeds the desired temperature. Under the influence of this heat and this flow of gas, the coal yields its oil and gas, but no sooner does the coal give up its oil than the latter passes immediately into a cooler atmosphere than that at which it was liberated. It is swept away by the gas pouring over the coal, and is condensed later and dealt with. It is because the oil once formed is never subjected to a greater heat than what it was released at that no oil in the process is "cracked." The plant at Barnsley is some 40 ft. long and 4 ft. broad. It is definitely stated that it pays its way, and it is the intention of the new company to build larger installations dealing with 100 tons of coal per day per unit.

We have given the description of the process and enterprise very much in the terms of its promoters. Low-temperature schemes in the past have not been uniformly successful, but the case stated by Colonel Moore-Brabazon is supported by the testimony of experts, and it is to be hoped that the confidence of the promoters will be justified by results. The enterprise, at least, can claim to be well backed, and every experiment helps towards the final solution.

The Late Dr. Crossley

THE death of Dr. A. W. Crossley, Director of the Shirley Institute of Cotton Research, on the day after his resignation of that post had been announced, removes a distinguished chemist and one who had already achieved much and promised to achieve more in the application of his science to the staple industry of his native county. During his presidency of the Chemical Society, though he generally looked remarkably well, it became known that Dr. Crossley's health was causing anxiety, and latterly his friends had regretfully realised that his was one of the careers to be prematurely terminated by illness. He was fifty-eight years of age, and though he had already an honourable record of scientific service, it is safe to say that the important work of cotton research, on which he entered a few years ago, would have added another important chapter to it had his life been spared.

Although Dr. Crossley's earlier successes as a student and teacher had demonstrated his ability as a scientist, it was not until the war that his ability came into full recognition. In 1915 the use of toxic gases in warfare suddenly disclosed the need of rapid and energetic organisation of counter operations. Dr. Crossley became secretary to the Chemical Warfare Committee of the Ministry of Munitions, and acted as chief liaison officer between the British and French forces on all matters of chemical warfare. In 1916 he took control of the R.E. experimental station at Porton, and directed all the experiments that finally made gas projection of all kinds, and in particular the special chemical squad of the Royal Engineers, one of the most important arms of offence in the war. In 1919 the newly formed British Cotton Industry Research Association invited him to become its first director of research. Here, as in the case of chemical warfare, his sound knowledge of science and his quiet gift of effective organisation soon produced remarkable results. Within two years research work was actually in progress on a practical plan, and so well satisfied have the promoters been with the results already attained that the industrial concerns interested have in some cases doubled their original contributions. Nothing could more convincingly demonstrate their faith in his scientific knowledge and methods. He had a singular gift for the co-ordination of the scientific with the practical, and it was no exaggeration on the part of one of his intimate associates to say that he was the one man who could successfully direct the work of physicists, chemists, and technologists without ever losing sight of industrial requirements. As a man and as a scientist, Dr. Crossley leaves a good record and example, and the only ground for lament is its much too early termination.

International Chemical Leaders

IT is interesting to note the prominent part taken by chemical leaders in the important conferences between leading industrialists of Great Britain and France which were held in London this week. Among the British representatives were Sir Max Muspratt, the President of the Federation of British Industries, and Mr. W. J. U. Woolcock, the general manager of the Association of British Chemical Manufacturers. On the French side, M. Duchemin, the President of the General Confederation of French Producers, is also President of the Union of French Chemical Industries. He was accompanied by, among others, M. Gounoud, who is the Vice-President of the Union of Chemical Industries, and M. Roché, the President of the Syndicate of Special Chemical Industries. Of these three French delegates, it is interesting to note that M. Duchemin is a descendant of Cobden, that the grandfather of M. Gounoud lived in England for some years, and that M. Roché is interested in chemical industry in this country as well as in France. Altogether (as one who took part in the deliberations remarks) there was a distinct chemical flavour in all the discussions and a feeling that the key industry was taking its proper place. This impression is further confirmed by the fact that Sir Alfred Mond presided at the Anglo-French Luncheon Club gathering in honour of the French delegates to the conference. Emphasising the international character of modern industry, he expressed the hope that "we shall see one day a parallel to the League of Nations delegations in a set of delegations of industries, quite as authoritative and powerful in the matter of industrial concerns as the League of Nations is in political matters."

The Cost of Being Governed

IF the Estimates and the Budget were complete, that is, if they could give us a really finished statement of the national position from every point of view, they would contain a mass of information that has nothing to do with the tax collector or the Treasury. Such a perfect national account as we have in view is, of course, impossible, but it is necessary that the taxpayer, the elector, and the business man should always have in

their minds a picture of the whole position, without which it is impossible for them to give its real or relative value to any particular item that may be under discussion for the moment. There are so many figures and so many returns that one hesitates to suggest any addition to them all, but we should like to see an authoritative statement which set out in simple form the relative cost of government and of other things. Public expenditure through Whitehall and all the many offices of the various forms of local government now amounts roughly to £3 per week per family. It has been estimated that what might be called the domestic expenditure of the people is in the neighbourhood of £2 per week per family. No official figures enable this comparison to be drawn with exactitude, and there is, of course, in such a statement ample room for differences of opinion, but if the proportions of £3 to £2 are anywhere near the truth, they bring out in a new light the position of the Englishman in the modern state created in the last quarter of a century. It is doubtful whether there would remain the same enthusiasm for the further development of public activity if the electors understood that they are paying more for government than for clothes and food and all the other comforts to be found in the retail shops of the country. This way of looking at things would become even more interesting if the proportions of three to two were set out clearly beside the corresponding proportions in America, which would be roughly 1 to 4, or in Germany, the figures for which are, in the same rough way, 1 to 3.

I.C.I. Directors' Report

In the report of the directors of Imperial Chemical Industries just issued, it is stated that the agreement to the fusion of interests on the part of the shareholders of the participating companies has been practically unanimous. The capital issuable in respect of shares surrendered for exchange to date represents over 96 per cent. of the total capital issuable in respect of the shares of the participating companies. The preliminary expenses of the company are estimated at £1,270,000—namely, company capital duty, £650,000; other stamp duties, £570,000; other expenses, £50,000. The statutory general meeting of the company is to be held in the Great Hall, Winchester House, London, on Friday, March 18, at 12.30, for the purpose of complying with the requirements of section 65 of the Companies (Consolidation) Act, 1908.

British Cyanides

A scheme sanctioned in the High Court on Tuesday involves a drastic reduction in the capital of British Cyanides, Ltd., from £400,000 to £118,725. The preference shares are reduced to 10s. each and the ordinary £1 shares to 2s. each. The cause assigned is the high American tariff, which has made it impossible of late to export the company's products to the United States. It is an example of the rapid change in position that may follow changes of circumstances in the consuming markets, and of the essential need of ready adaptation to altered conditions. In this case, it is believed that the company have certain good propositions in hand, and what has been lost in one direction may possibly be made up in others.

Books Received

Van Nostrand's Chemical Annual. Edited by Dr. John C. Olsen. London: Chapman and Hall, Ltd. Pp. 882. 21s.

Physico-Chemical Metamorphosis and Some Problems in Piezochemistry. By Ernst Cohen. London: McGraw-Hill Publishing Co., Ltd. Pp. 190. 12s. 6d.

X-Rays Past and Present. By V. E. Pullin and W. J. Wiltshire. London: Ernest Benn, Ltd. Pp. 230. 12s. 6d.

The Paper Mill Chemist. By Henry P. Stevens. London: Ernest Benn, Ltd. Pp. 318. 10s. 6d.

Die Theorie der Psychischen Wellen. By J. H. van der Crab. Holland: Hollandia-Drukkerij. Pp. 90. F.2.25.

Lehrbuch der Enzyme. By Prof. Carl Oppenheimer. Leipzig: Georg Thieme. Pp. 660. M.36.

The Purification of Industrial Waters. By the Paterson Engineering Co., Ltd., Windsor House, Kingsway, London.

Doubling Our Coal Power. By A. Allport. Yorks: Wadsworth and Co. Pp. 64. 6d.

The Calendar

Mar.		
14	Institute of Chemistry (Leeds Section).	Leeds.
14	Institution of the Rubber Industry (London Section): "Rubber Pigments from the Point of View of the Manufacturer." C. A. Klein. 8 p.m.	Engineers' Club, Coventry Street, London.
14	Institute of Metals (Scottish Section): Annual General Meeting. "Moulding Sands." G. Watt Tyrrell. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
14	Sir John Cass Technical Institute: "Gas Works Practice." Dr. H. G. Colman. 6 p.m.	Jewry Street, Aldgate, London.
15	Hull Chemical and Engineering Society: "Hydro-Electric Power in the Argentine." H. Peck. 7.45 p.m.	Grey Street, Park Street, Hull.
16	Electroplaters' and Depositors' Technical Society: Discussion on "Electrodeposition of Alloys." 8.15 p.m.	Northampton Polytechnic Institute, St. John Street, London, E.C.1.
16	Society of Chemical Industry (South Wales Section): "Further Notes on Pure Chemicals." E. A. Tyler. 7.30 p.m.	Technical College, Mount Pleasant, Swansea.
16	Society of Chemical Industry (Newcastle Section): "The Reaction between Hydrogen Sulphide and Iron." J. Peel and Dr. P. L. Robinson. 7.30 p.m.	Armstrong College, Newcastle-on-Tyne.
16, 17	Society of Glass Technology. 2.30 p.m.	The University, Edmund Street, Birmingham.
17	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, London.
17	Institute of Metals (London Section): "The Works' Chemist." C. E. Barrs. 7.30 p.m.	83, Pall Mall, London.
17 & 24	Royal Institution: "Colour Measurement and Standardisation." J. Guild. 5.15 p.m.	Albemarle Street, London.
17	Royal Society. Papers by W. L. Bragg, J. West, W. A. Wooster, J. F. Spencer, and E. M. John. 4.30 p.m.	Burlington House, Piccadilly, London.
18	Royal Institution: "Rigidity and other Anomalies in Colloidal Solutions." Emil Hatschek. 9 p.m.	Albemarle Street, London.
18	Society of Dyers and Colourists (Manchester Section): "Cotton Cellulose and Cellulose Artificial Silks: A Comparison of some Fundamental Physical and Chemical Properties." A. J. Hall. 7 p.m.	36, George Street, Manchester.
18	Chemical Engineering Group, Institution of Chemical Engineers and Coventry Engineering Society: "The Importance of Chemistry to the Engineer." Professor J. W. Hinchley.	Coventry.
18	Imperial Chemical Industries, Ltd.: Statutory general meeting. 12.30 p.m.	Winchester House, London.
19, 26	Royal Institution: "The Alpha Rays and their Application to Atomic Structure." Sir Ernest Rutherford. 3 p.m.	Albemarle Street, London.

Conference of the Institution of Chemical Engineers

Papers on Chemical Lead, Sulphuric Acid, an Other Subjects

On Wednesday and Thursday the Institution of Chemical Engineers held a conference at Burlington House, which was followed by a corporate meeting at the Hotel Victoria on Friday. At the meeting a number of papers were read and discussed. Abstracts of the papers are given below.

THE first paper at the conference, on " Lead as a Constructional Material for Chemical Plant," was read by Mr. S. J. Tungay. He said that as an acid-resisting metal lead stood unique in many respects, having peculiar and outstanding advantages not possessed by other pure metals of reasonable cost. Its reasonable cost and great purity were very largely responsible for the fact that lead had been for many years the most widely applied metal for withstanding chemical action and corrosion, and it still remained practically the only metal which was suitable for building large chambers and towers required for the manufacture of vitriol by the still extensively used chamber process. Excellent as this material was, its excellencies were for a great part limited to its application for resisting sulphuric acid and liquids containing the same. There were comparatively few other acids for which lead was of any very great service. In the ordinary way lead was a perfect resistant to cold sulphuric acid, even though in a dilute condition ; and it would withstand the acid either hot or cold. Singularly, when they wished to handle a sulphuric acid of a strength exceeding 80 per cent., corrosion of the lead was soon apparent, particularly in cases where the acid was hot, whilst with oleum or fuming sulphuric acid lead broke down altogether, and was rapidly corroded away ; hence, with concentrated forms of sulphuric acid other materials were required.

Requisite Purity of Lead

From its very extensive application as a resistant to sulphuric acid and liquids containing the same had arisen the term " chemical lead." This lead was usually a refined lead as produced by lead manufacturers, of 99·99 per cent. purity. He preferred to term this metal " acid resisting lead." A body of competent authorities on the question of chemical lead stipulated that the lead must be of 99·99 per cent. purity. The impurities forming the remaining 0·01 per cent. of metal usually consisted of very slight traces of copper, silver, antimony, zinc, iron, possibly also remote traces of arsenic, nickel, bismuth, and tin. Mr. Tungay mentioned a case of failure, owing to corrosion, of lead cracker pipes in a sulphate of ammonia saturator, although the lead was 99·99 per cent. pure. Ultimately it was determined that mechanical strains and continued sagging of the metal were undoubted causes of failure ; for when the pipes were finally supported in such a manner as to prevent any possibility of creeping or deformation during operation of the plant, no unreasonable amount of corrosion was experienced.

The satisfactory application of lead was not restricted to its use with sulphuric acid. Acid-resisting lead was widely used for the concentration of phosphoric acid ; the construction of plant for sulphonation and chlorination processes ; for the construction of sulphate of ammonia plant, including the heavy lead saturators used in this process, also pipe work, drainers, and other accessories for sulphate of ammonia manufacture ; and in connection with the explosives industries, nitro-glycerine saturators, together, in fact, with almost the entire equipment of nitro-glycerine plant. For uses with mixed acid the acid-resisting lead had been found to be highly serviceable, providing the nitric acid content was not excessive, and it also found application in plant for the preparation of dyestuffs intermediates.

Homogeneous Lead Lining

In the application of acid-resisting lead to vessels required to sustain pressure, a protective internal lining of lead was often applied to walls of iron, steel or copper, or other stronger metal. Either this could be lined with lead sheet or a perfect homogeneous surface of lead could be arranged to cover the entire surfaces. Of all the methods of lead coating the homogeneous lead coating was unquestionably the best, providing it was satisfactorily accomplished. Other methods which had been practised were tinning the surfaces of metal and then soldering on lead sheet, electro-deposition of lead direct on to metal, spraying metal surfaces with molten lead by the " Schoop " or spray process, the " Zeitler " process of America, etc. Mr. Tungay finally dealt with hardened lead, discussing lead-antimony alloys (regulus metal) of various compositions.

Acetylene in Lead Burning

Mr. W. C. Freeman described " The Production of Dissolved Acetylene and Its Application to Lead Burning." The evolution and development of various blowpipes using acetylene mixed with other gases was described, culminating in the oxy-acetylene blowpipe. Dissolved acetylene was used ; this dissolved acetylene was commercially described as a pure, dry, cold gas compressed in steel cylinders containing a porous mass (kapoc) and acetone as a solvent to a pressure of 15 atmos. or 225 lb. per sq. in. The acetylene was in a pure form, being freed from such impurities as phosphine, hydrogen sulphide, ammonia, water vapour, carbon dioxide, etc.

The oxy-acetylene lead-burning plant provided a stable flame of maximum temperature combined with minimum velocity, and delivered from a blowpipe having exceptionally small tip orifices. This combination made the operating rate so rapid that there was practically no loss of heat by conductivity, whilst the consumption of both gases was so small that long burning periods were provided from small portable cylinders (where portability was essential). In connection with this paper demonstrations of oxy-acetylene lead burning, and of flat-lead burning with the air-acetylene blowpipe, were given.

Schmiedel Boxes in Sulphuric Acid Manufacture

" A Note on the Function of the Schmiedel Box in the Manufacture of Sulphuric Acid " was read by Dr. H. J. Bush and Mr. A. Grounds. They pointed out that in the manufacture of sulphuric acid efforts were constantly made to cheapen the process by the development of intensive units. In the metallurgical industry legislation was possible which would compel plants to render their exit gases harmless, and hence metallurgists were showing an increased interest in the utilisation of metallurgical fumes for the production of sulphuric acid. One of the difficulties in such a case was the great variation in sulphur dioxide concentration which might occur over small periods of time. Dr. Schmiedel had worked out a system for dealing with such cases.

The authors described such a plant, working at Mitterberg Kupfer Akt.-Ges., in Austria, which, although it was inferior to the modern Schmiedel plant, deserved to be quoted. In this plant the gas from the copper smelting plant reached the " Schmiedel " boxes *via* flow-regulators and drying towers. The six boxes are arranged in series, and are 16 ft. 5 in. long by 6 ft. 6 in. wide and 4 ft. deep. They are provided with three antimony lead fluted rollers, each 8 in. diameter by 5 ft. 11 in. long. The boxes are built of 8 lb. lead, and are reinforced by wood and iron framework. Glass inspection jars are fitted over the rollers so that the spray can be observed. The rollers run at 600 revolutions per minute and are belt driven from the main line shaft under the box. The boxes are so constructed that the rollers are carried in side shields, thus being capable of withdrawal without cutting the leadwork of the box. The height of acid in the box is regulated by a run-off box in which weirs, made of lead strip, can be added or removed as required, and the stuffing boxes of the roller spindles are packed with one round of asbestos cord at the bottom of the stuffing box and then with a mixture of graphite and vaseline. On leaving the Schmiedel boxes the gas passes through the first absorber, thence to a stoneware pan, and from thence through four more absorbers, working in series. Acid is fed to the plant in three rings, of which the last, or water box, constitutes one circuit, the four production boxes form another circuit whilst the first (*i.e.*, the denitrating box) forms the third circuit.

Function of the Schmiedel Box

The Schmiedel box really functioned, said the authors, in the same way as a Glover tower. Sulphuric acid containing the equivalent of up to 1·5 to 2·0 per cent. of 100 per cent. nitric

acid was fed into the boxes. The sulphur dioxide reacted with the nitrose (solution of nitrosulphuric acid in sulphuric acid) according to the equation :

$$2HO(ONO)SO_2 + SO_2 + 2H_2O = 3H_2SO_4 + 2NO.$$

This presumably balanced reaction required the presence of a mixture of nitrose, sulphur dioxide and water.

Schmiedel boxes had been incorporated in six of the sulphuric acid works in England and Wales. The number of boxes actually installed was 33, and these had been built partly as complete Schmeidel units or partly as units incorporated with a view either to replacing chambers or towers or simply to add to acid production. The two pure Schmiedel plants had both been installed at metallurgical works where zinc blende was roasted for the production of spelter. The sulphur dioxide coming from the roasters was used for the manufacture of sulphuric acid. For the treatment of very poor gases, of gases fluctuating rapidly in concentration and of coal gases, the Schmiedel box formed a very valuable addition to the plant available for the sulphuric acid manufacturer. In addition, it was recommended that where it was proposed to instal Schmiedel boxes, these should be incorporated in such a manner that they were followed, as far as the gas circuit was concerned, by a reaction tower in which the exit gases from the box would react vigorously. In plants where the demand for acid was variable, the Schmiedel box formed a valuable unit in that it might be switched into and out of the circuit almost instantaneously, and would produce acid from the cold without the necessity of preheating the gas. It was therefore eminently suitable as a boosting unit, whilst it could also be used to replace such units as chambers, towers, etc., in sets where a reaction tower could be provided immediately behind it.

Mills-Packard Sulphuric Acid Plants

Mr. W. G. Mills described " Recent Developments in the Mills-Packard Chamber Plant." The Mills-Packard sulphuric acid chamber, he said, had met with considerable success since the first experimental chambers were built in 1914. There were now in existence sixty-four installations belonging to more than forty different companies in various parts of the world. The number of units in service or under construction exceeded 250, with an approximate capacity of 2,500,000 cubic feet, and producing in the neighbourhood of 400,000 tons of chamber acid per annum. Chambers of the standard type had been built in five sizes, as follows :

Size.	Height.	Diameter of Base.	Diameter of Ceiling.	Approximat Capacity
	ft. in.	ft. in.	ft. in.	Cub. ft.
1	40 0	20 0	10 0	7,330
2	40 0	23 6	13 6	11,000
3	47 0	23 6	11 9	11,890
4	47 0	25 6	13 9	14,630
5	48 0	28 0	16 0	18,750

The chief difference between an installation of ordinary rectangular chambers and that of the Mills-Packard chambers was in the shape of the chambers which, in the latter system, took the form of the frustum of a cone externally cooled by water. The chambers had been constructed with steel, wood, and reinforced concrete framework. The approximate weight of steel and lead required for the various size chambers of the standard type was as follows. The quantities given were for a single chamber and the quantity of lead included the necessary connection pipe of ample dimensions, from chamber to chamber.

Capacity of Chamber.	Weight of Steel.	Weight of Lead.
cu. ft.	Tons.	Tons.
7,330	6·0	13·0 to 13·5
11,000	7·5	16·5 to 17·0
11,890	8·0	17·5 to 18·0
14,630	9·0	19·5 to 20·0
18,750	10·0	22·5 to 23·0

Considerable attention was paid in this paper to the method of distributing the cooling water on the walls of the chambers, as although it was found that with a sloping wall a good flow could be obtained, it was not an easy matter to get a uniform flow of water over the whole surface.

Glass Industry Progress

Lecture by Professor Turner

At a meeting of the London Section of the Society of Chemical Industry on Monday, Professor W. E. S. Turner, of the Department of Glass Technology, Sheffield University, gave a lecture on " Recent Progress in the Glass Industry," in which he briefly reviewed the economic aspect of the subject, touched upon the influence of machines and automatic methods on the economic position, and finally made some reference to research and scientific development in the industry generally. He showed that the distribution of glass factories throughout the world was such that Germany headed the list with 383, the United States had 310, and Great Britain had 115 factories.

Dealing with the ratio of imports to exports of glassware in the case of various countries, it was shown graphically how this country was at one time an exporting country, but that the ratio fell rapidly until about 1880 and was then maintained at a very depressed level until the war, when the ratio went up but rapidly came down again afterwards, owing to the flooding of the country with cheap Continental glass. The exports of Germany, on the other hand, showed an extraordinarily rapid rise during the same period, and although British exports had gone up slightly, the rate of increase was extremely small compared with other countries. The export of optical glass from Germany, however, had not reached the pre-war level again after the drop during the war. At the present time there were three firms making optical glassware, but he believed there was now only one such firm in Germany. There had, of course, been amalgamations throughout the industry which had had some interesting and curious effects. These, together with the introduction of automatic machinery, had resulted in the closing down of many factories and reductions in the number of employees, with, at the same time, an increase in output.

Effect of the War

In the same way, the war had had an influence which affected the available markets for the British industry. For instance, the glass industry was developing in Canada, although at the moment one or two factories had had to close down because of the importation of cheap Belgian glass. There were, however, some seven factories in operation there. In Australia, the glass industry was making headway and a combine had been formed with a capital of £2,000,000, the strongest feature being bottle production. The capital would probably now be more than £2,000,000, as another branch of the industry had been taken over.

Larger and larger outputs brought about by the use of machinery had called for improved refractories for the furnace linings and a vast amount of research had been, and was still, going on in this connection. It had been found that the glass materials in the furnace, at a temperature of about 1,400° C., had a very corrosive effect on refractory materials, but this had been overcome to a large extent by the introduction of sillimanite and mullite, a life of five or six weeks being increased to 10 or 11 months, and in special cases to a matter of years. As regards chemical glassware, it was pointed out that machinery had not yet been adopted to any extent, but that important developments might be looked for. The tendency here was to make such glass of high acid composition. Both as regards chemical and optical glass, the influence of the advantage of the Safeguarding of Industries Act had been very marked.

Discussion

During the course of a discussion, it was suggested that chemical glassware now in this country was not so good as it was before the war, and it was asked whether there had been a deterioration in the skill of our operators. Replying, Professor Turner said there seemed to be a general complaint throughout the world of a falling off in craftsmanship. Some workers, however, particularly the Belgian, seemed to have an intuition for the work without any effort at scientific organisation. So far as the new large British bottle-making machine which had been referred to was concerned, he regretted the fact that with very few exceptions—and this was one of them—both in this country and even in Germany we seemed to be looking to America to help us out of our difficulties regarding machinery for the glass industry.

The Non-Inflammable Film

By H. J. Mallabar, F.R.P.S.

By the courtesy of "Discovery," the well-known scientific monthly journal, we are able to reproduce the following interesting article on the new non-inflammable film. The author is the inventor of the new product, and his article appears in full in the March issue of "Discovery."

THERE are many problems, some of them extremely difficult, to be solved in manufacturing a photographic cinema film, starting with the cotton and carrying on through the successive stages before the final film is packed ready for delivery to the user. When one carefully considers the enormous amount of skilled work involved in the great number of processes it has to pass through, combined with the very high standard of precision that must be obtained in the regularity and thickness of the film base, the consistent standard grade and speed of the sensitised emulsion, and the freedom from mechanical or chemical defects, it is marvellous that it can be, and is, sold at such a low price—approximately three-farthings a lineal foot.

Manufacture of Ordinary Films

To make this ribbon of cine film the highest grades of gelatine from the animal kingdom, cotton from the vegetable kingdom, and silver from the metallic, are used in enormous quantities, so large that one can hardly conceive them. Yet it was only thirty years ago that this now enormous industry was founded by the invention of Paul's Theatrograph, following, a few years previously, the making of a celluloid film in continuous length by Eastman.

From then until now celluloid has been universally used as the film base, or support, and although stringent regulations are enforced where it is used, there remains a long record of disasters owing to its explosive and highly inflammable nature. In consequence, a vast amount of research work has been undertaken to produce a film that would be non-inflammable, and therefore safe to use in home, school, or theatre; and as there is at present no known substance that can replace cellulose for this purpose, work has been concentrated on the acetate of cellulose instead of on the dangerous nitro-cellulose.

Cellulose acetate, first discovered by Cross and Bevan, who took out the original patent for its manufacture, has not in the past been satisfactory. The earlier cellulose acetates, such as that of Cross and Bevan, were soluble only in chloroform—which nullified any commercial value they may have had—and it was some years later before Mills patented his process of making them soluble in acetone, a cheap and therefore commercially valuable solvent. Cellulose acetate, however, did not make films equal to the nitro-, and if such films did not melt in the heat of the projector, they became so brittle that after running through the projector several times they broke so badly at the perforations as to be useless, in addition to which the cost of manufacture was considerably higher than for nitro-cellulose.

Another serious obstacle in using cellulose acetate was, and is, that only a limited few firms in the world can make it; of that few, only two or three can make a really good acetate, and as these firms make it for their own purpose, which as a rule consumes their entire output, it is difficult to obtain supplies in small quantities and impossible in the large quantities required for serious film manufacture.

To make a perfect non-inflammable film, therefore, one must be able to make for oneself a cellulose acetate not only of the very finest and regular quality, but of a nature possessing special properties for film. That is, having in view the fact that it is to be used for photographic film, the process of making the cellulose acetate must be one which produces an acetate eminently suitable for that purpose, in not only enabling a non-brittle film to be made, but at the same time a film that does not affect the delicate light-sensitive photographic emulsion which subsequently must be coated thereon, acetic acid having a desensitising action on silver bromide.

Details of the New Process

I may explain here that there is no difficulty in making a non-inflammable film—one has only to dissolve cellulose acetate in acetone, and cast it on a highly polished surface to dry in order to obtain it; a film so made, however, is useless without the additions that must be made to the above solution to secure the properties required. When this patent solution, of which obviously I cannot disclose the composition or method of manufacture, is made, and filtered, it is cast on a highly polished metallic wheel of large circumference, in such a skilled way that the film, when measured in any part of its length or its width of approximately 43 in., will not vary between the limits of 0·136 to 0·140 millimetres.

Such a film must never become brittle, it must not affect the silver emulsion, and it must stand heat without any signs of collapse. (The acetate film I have invented stands about 100° C. more than the nitro film before collapsing.) It must withstand intense cold without crystallising, must not stretch or shrink beyond the permissible limits in the developing, fixing, and washing operations, and it must meet its nitro rival in the matter of cost production.

When the roll of film is made it is slit down its centre lengthwise, giving two rolls of 55 centimetres width, and before this is coated with the light-sensitive gelatine emulsion, it must undergo one of the most difficult operations in its manufacture, namely, treatment in such a way that the gelatine will correctly adhere, as gelatine coated on celluloid or acetate of cellulose film will, when dry, peel off of its own accord. That there are many manufacturers of roll film, but a limited number of cine film, is due, among other reasons, to this problem of correct adhesion, as the method adopted by many manufacturers of making the gelatine emulsion adhere, whilst satisfactory for films other than positive cine film, is useless for the latter, and would render the film brittle.

Difficult as the problem is with a nitro- base, it is far more difficult with an acetate base. The film ribbon when running through the projector not only has to withstand an intense heat (so intense that if a nitro-film were stopped for one moment it would take fire), but it has to withstand the mechanical strains of the projecting apparatus; and as the co-expansion of the acetate base and the gelatine emulsion coated thereon are so different, something has to give away under the above conditions.

Now if the base is treated in such a manner that the gelatine coating is firmly welded to it, the gelatine coating, which under the intense heat becomes horny and brittle, will crack. It is also found that, although the gelatine film is very thin compared to the base, if these two are firmly welded together, and the gelatine cracks, it will crack right through the base-support also, whether that support is acetate or nitro; and the films so made, however good the base is otherwise, will only have a short life in the projector. A state of adhesion must therefore be obtained in which the gelatine emulsion will adhere sufficiently to enable it to be developed, washed, dried, and handled without any sign of the two separating. Yet when it has to face the strain in the projector the gelatine emulsion must be free to "creep" on the surface of the base. This is a difficult matter, and I think very few have solved it with non-inflammable film.

After this treatment of the base, known as "subbing," the prepared film is coated with the light-sensitive positive emulsion, which must be brilliant, free from fog, and always of the same speed and gradation. After this operation it is dried, then slit to the standard width of $1\frac{3}{8}$ in., and examined for defects; it is then perforated with 64 perforations per lineal foot, after which it is reeled and packed ready for distribution to the producers of the pictures with which we are all so familiar on the screens.

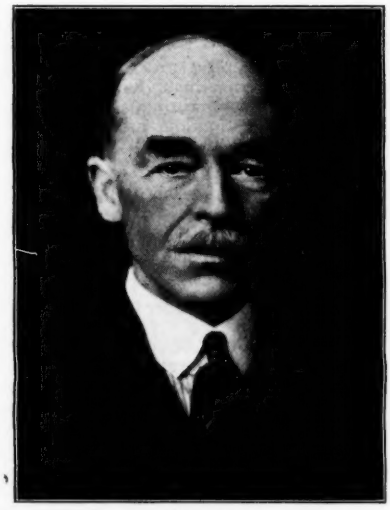
Up to the present no manufacturer in Great Britain has manufactured this cine film throughout, starting with the raw cellulose in the form of cotton. This state of affairs, however, will be remedied in the future, as soon as the makers of the necessary extensive plant required can deliver and erect it. Then, and then only, can "all British" pictures be produced, as, in my opinion, a picture produced by a British company with British capital and British artists is not an all-British film when the base itself and the labour in making it is carried out abroad. The new British product will be free from all the dangers of the celluloid film, and will thus open up many new fields for cinematography, especially for educational purposes.

The Late Dr. A. W. Crossley

An Appreciation

DR. A. W. CROSSLEY, who died on Saturday last at his residence, Thorngrove, Alderley Edge, was the son of the late Richard Crossley, of Accrington, Lancashire, and was born there on February 25, 1869. After receiving his school education at Mill Hill he entered the Victoria University, then the Owens College, Manchester, where he graduated in the Honours School of Chemistry in 1890. Like so many of the younger chemists of those days he found it desirable to complete his studies in Germany, and he spent the next two years in Berlin and Würzburg, obtaining the doctorate of the latter University in 1892. In 1894 he returned to Manchester and was awarded a Bishop Berkeley Fellowship which, however, he relinquished the following year on his appointment as Lecturer at St. Thomas's Hospital. He held this post until he obtained the Chair of Chemistry of the Pharmaceutical Society in 1904, and it was during these ten years that he showed himself to possess the initiative and power of organising research which were ultimately to place him in the front rank of modern organic chemists. In 1899 he was awarded the D.Sc. of the University of Manchester and in 1907 was elected Fellow of the Royal Society. In 1914 he became Daniell Professor of Chemistry at King's College, London.

Early in his career Crossley showed evidence of the organising ability which was subsequently to enable him to do public



DR. A. W. CROSSLEY.

work of the highest importance. He was President of the Union, at Manchester during his student days, and was Secretary of the Chemical Society from 1905-1913 and its Foreign Secretary from 1913-1925. When war broke out he at once placed his services at the disposal of the scientific organisation formed by the Royal Society, and subsequently, when matters became more specialised, he transferred his assistance to the committee presided over by Sir Louis Jackson, becoming secretary of that portion of the Trench Warfare Department dealing with chemical matters. The need for a larger experimental ground led in 1916 to the acquirement of land at Porton, near Salisbury, and it is, without question, due to Crossley's organising skill that this development attained the success it has achieved. He was given the rank of Lieut.-Colonel and for some time acted as Liaison Officer with France, being made an officer of the Legion of Honour for his services to the French Government. He was created C.M.G. in 1917 and C.B.E. in 1919; in 1918 he was awarded the Longstaff medal of the Chemical Society.

One of Crossley's chief characteristics was his desire to seek out and do what he thought wanted doing and to put all his energy and ability into carrying the project through despite the chances for and against success. He was essentially a pioneer, and when the Department of Scientific and Industrial Research launched its great scheme for the formation of Research Associations in various industries, it fell to Crossley's lot to initiate and organise that allotted to the Cotton Industry. The success that has attended his efforts is now well known, and the Association he has created stands as a model for all to see. Failing health led him to resign the Presidency of the Chemical Society last year, after only one year of service, and, subsequently, his resignation of the Directorship of the Cotton Research Association was announced on the day of his death. He married Muriel, daughter of Ralph Lamb, of Liverpool, who, with one son and a daughter, survives him.

A kindly man and a firm friend, he will always be remembered by those who knew him well, as one who set duty before all else and who expected others to offer the same measure of service as he was prepared himself to give. J. F. T.

Funeral of Dr. Crossley

The funeral of the late Dr. A. W. Crossley took place at the Manchester Crematorium on Wednesday, when the Rev. C. B. Welland, rector of St. Mary's, Alderley, officiated. In addition to the family mourners there were present:—Mr. Kenneth Lee (chairman of the Cotton Research Association), Professor H. B. Dixon and Mr. S. E. Carr (representing the Chemical Society), Professors A. Lapworth, R. Robinson, and F. L. Pyman (Manchester University), Dr. C. R. Young (the Department of Scientific and Industrial Research), Major G. H. Welsford (Chemical Warfare Committee), Mr. L. Guy Radcliffe (chairman of the Manchester Section and representing the president and Council of the Society of Chemical Industry), Mr. Ernest Melling, County and Public Analyst (representing the Institute of Chemistry and the Society of Public Analysts), Professor S. Smiles (King's College, London), Drs. Fargher, Clibbens, Shorter, and Oxley (British Cotton Industry Research Association, Shirley Institute, Didsbury), and the staff of the British Cotton Industry Research Association, Shirley Institute.

British Standard Specifications

THE British Engineering Standards Association has just issued British Standard Specifications No. 277, 1927, for Zinc Oxide Ready Mixed Linseed Oil Paint (Oil Gloss) and No. 278, 1927, for Tinted Zinc Oxide Ready Mixed Linseed Oil Paint. They contain clauses regulating the composition, together with standard reception tests, for the purchase of these materials, and also appendices giving methods of carrying out the tests. These specifications have been prepared at the request of the paint manufacturers by a committee representative of both the buying and manufacturing interests, and as in the case of all British Standard Specifications, they will be reviewed as experience of their working or progress in the industry renders it necessary, and revised issues will be published from time to time. Amongst other specifications in hand which will be published as completed are the following painting materials: Red oxide of iron oil paste, classes 1 and 2; lead chromes; Prussian blues; lithopone; lithopone oil paste; carbon black; mineral black; vegetable black; lamp black; and gold size. Copies of the two above new specifications (Nos. 277 and 278, 1927) may be obtained from the B.E.S.A. Publications Department, 28, Victoria Street, London, S.W.1, price 2s. 2d. each, post free.

Dinner to Sir D. Milne-Watson

A COMPLIMENTARY dinner was given on Tuesday evening, at the Savoy Hotel, by the governing bodies of the several national organisations of the gas industry, to Sir David Milne-Watson, the governor of the Gas Light and Coke Company, and president of the National Gas Council of Great Britain and Ireland. Among those present were:—Professor Arthur Smithells (in the chair), Mr. Percy Ashley (Board of Trade), Alderman Sir A. Ball, Mr. Clive Bigham, Professor J. W. Cobb, Mr. John E. Cowen, Sir Arthur Duckham, Mr. J. H. Ellis, Sir Fortescue Flannery, Mr. R. W. Foot, Mr. W. L. Galbraith, Mr. F. W. Goodenough, Mr. T. Goulden, Brigadier-General H. B. Hartley, Mr. T. Hardie, Councillor W. J. Harvey, Mr. R. M. Holland-Martin, Mr. F. H. Jones, Alderman Sir W. Kay, Alderman J. H. Lloyd, Mr. J. W. Napier, Bailie J. B. Paterson, Mr. J. F. Ronca, Alderman J. H. Waddington, Mr. W. E. Whyte, Mr. John Wilkinson, Mr. H. Woodall, Lieutenant-Colonel H. W. Woodall, and Mr. H. James Yates.

Reviews

THE PAPER MILL CHEMIST. By H. P. Stevens. London: Ernest Benn, Ltd. Pp. 318. 10s. 6d.

The third edition of this handbook marks the endorsement of the technical public: it is recognised as a useful contribution to the progressive technology of the craft. It certainly was at the date of its first appearance a definite step forward from the nebulous empiricism of an industry peculiarly jealous, in this country, of the oral tradition and the "masonry" of apprenticeship. The author was then an active worker in this field and in collaboration with his late partner, Clayton Beadle, attained a prominent all-round position in the paper-making world.

In this revised edition he claims to have brought the matter and the text to the level of present day practice. Passing from his preface to the index of subject matters we looked for such title words as "Hydrogen Ion" (or p_H control), "Piezometer," "Colloids" (or colloid-chemical phenomena), "Hydration" (mechanical and chemical)—in other words, for recognition of the new order of theoretical control of factory routine, with co-ordinate pursuit of new qualities and effects to be realised in the finished products of the industry. Finding no mention of such, and taking note of the exposition methods of the earlier chapters, we conclude that the author has deliberately ruled out any didactic treatment of the subject above the presumed level of the works apprentice promoted to the laboratory.

In our view this tempering of the winds of doctrine misses its mark or purpose. In a field of experience very remote from that under consideration we have found that a London East End audience is stirred by the "classics" of music (as they should be) in vastly greater degree than by the "music and water" of the "popular" writers. We pass the remark with a solemn *ainsi soit il!* to mention one or two critical illustrations from the text.

In chapter I, "Weights and Measures," an *exposé* of the "metrical" system does not mention the word "decimal," nor particularise its second major claim, that of bringing the measure of mass (weight) into simplest relationship with that of space, through the standard substance (water). Hence the vast simplification of numerical co-ordinations and calculations in science and industry duly recognised by general adoption outside this country. The metre has no objective significance, and it is responsible for the pleonasm "metrical," for which a substitute might be formed. In the tables of numerical data we suggest that the "integral" 0, should always be retained in expressing fractions. Also, we remark that the French franc has lost its claim to be included in any table of values presumed to be constant, or approximately so.

In chapter III, "Water," the author retains the "Clark" soap test, and the old-world ritual beginning with the selection of a "genuine Castile soap" as a standard form of the complex mixtures which constitute commercial soaps. After some pages of exposition we arrive at the author's critical conclusion, "Unfortunately the method is not an exact one," to which we add "which is *a priori* evident," and our own conclusion in brief terms: Wanklyn has had his day and the new chemistry has outgrown "Wanklyn and Water." The author in effect recognises this in an appreciative account of the Permutit process. He might have made it his text for an exposition of the whole matter in the light of the physical chemistry of highly dilute solutions, and in co-ordination with the reactions of the beating process which involve those of the disperse forms of the amphoteric fibre colloids.

In the later chapters, however, which comprise the main subject matter of the handbook, viz., "Raw Material," "Fibrous Raw Materials" and "Paper Testing and Analysis," the author shows himself a better worker than teacher, and the text is replete with good matter well arranged and set forth in terms calculated to carry speedy and correct information to fellow-workers.

These features qualify it as an excellent handbook of the industry, useful to the manufacturer and "consumer" of papers. In regard to later editions we suggest to the author that the scientific development of the industry should be recognised as requiring a grasp of modern theory and correlatively the revision of the chapters on general methods with excision of redundant matters.

C. F. CROSS.

INDUSTRIAL CHEMISTRY. By S. I. Levy, M.A., Ph.D., F.I.C. London: G. Bell and Sons, Ltd. Pp. xiii, 288. 15s.

This book is remarkably well written, it is free from inaccuracies, and it covers much ground. Apart from general principles, which are discussed in some detail, it deals with many unit processes, such as heating and cooling, grinding and sieving, mixing and kneading, filtration and washing, scrubbing and extraction, distillation and evaporation, and drying and sublimation. The last named are the essence of chemical engineering, and as such, they merit attention.

It treats of general works equipment, under which heading the transport and manipulation of materials are dealt with: it discusses the pumping of liquids and the movement of gases. It affords a general survey of chemical industries, which are divided conveniently into metallurgical, fuel, heavy chemical, other inorganic chemical, organic chemical, and colloid industries, ranging from iron and steel, fertilisers, soap, glasses and enamels, to fuel, and finally to sulphuric acid and alkali. The survey in this connection is a comprehensive one, and there is much that will repay careful study.

Dr. Levy's association with Quinan during the war placed him in a unique position, of which he has not failed to take advantage. Yields and efficiencies were then his *métier*; he knew where to look for losses, not only in the manufacture of oleum, nitric acid, picric acid and T.N.T., but in the production of nitro-cellulose and nitro-glycerine. He knew how to develop the innate spirit of contest among the various departments of the various Government factories, and to this, in a large measure, their efficiency was attributable.

A perusal of his chapter on process costing and process costs must recall many meetings during the war years to many chemists and works superintendents who are now to be found in all parts of the kingdom and many foreign lands. There is much that is fundamental in this treatment, and it cannot fail to have a wide appeal.

Altogether, the book deserves, as it has so far received, a warm welcome.

P. PARRISH.

FAMILY ENDOWMENT. By Alexander Gray. Ernest Benn, Ltd. 4s. 6d.

A very determined movement is afoot to introduce the principle of family endowment into our wages system. It is argued by Miss Eleanor Rathbone and many others that the payment of the same wage to a bachelor and to a man with a family is an injustice that should be removed. Agitation on this subject has been much strengthened by the fact that abroad, especially in France and Belgium, efforts have been made in this direction. Certain trades, by agreement, set up pools into which a percentage of all wages is paid, and from which allowances are made to wage earners with dependents. The case for some such plan is quite complete if the appeal is to be made only to sentiment and emotion, and a good deal of literature has been issued by the Family Endowment Society in its support.

This little work by Mr. Alexander Gray takes the other view and points out the dangers of these proposals. Mr. Gray is well qualified for the task and speaks with an authority that is all too rare in discussions of this character. This will be realised when it is recalled that he was for nine years engaged in the administration of the Insurance Acts, is Chairman of the Consultative Committee of the Scottish Board of Health Insurance, and a member of the Advisory Committee of Experts of the International Labour Office on Local Insurance Questions. "Family Endowment," which the author calls a critical analysis, does not set out to make a case. It states impartially and fully what there is to be said for and against these proposals, and in the end demonstrates that their application cannot fail to lower the basic rate of wages. Mr. Gray possesses a racy pen and a sense of humour, and thus what might have been a heavy dissertation on technical questions becomes a charming little book which even the layman can read with interest. To employers, trade union leaders, and all involved in any way in the practical side of the wage problem, "Family Endowment" is a book which should be read.

The Chemistry of Cellulose

Professor Haworth on Recent Work

PROFESSOR W. N. HAWORTH, head of the Chemical Department of the University of Birmingham, delivered his presidential address to the University Chemical Society recently, taking as his subject "The Chemistry of Cellulose."

Professor Haworth said that the widespread occurrence of cellulose, the substance contained in the cell walls of plants, as well as the vast number of industrial uses to which it was put, rendered this organic material one of the most fascinating from the point of view of the chemist. One had only to enumerate the industries which were dependent on cellulose for their existence to be assured of the great service which this organic substance gave to mankind. The cotton industry, with its related branches of bleaching, dyeing and finishing; the manufacture of paper, artificial silk, and explosives such as cordite; all went to this source for their raw material. Nor should it be forgotten that the coal measures owed their existence to a pre-existing vegetation in which cellulose was largely represented, whilst the possibility of the use of waste cellulosic materials such as sawdust for the production of industrial alcohol was now one of the live topics of the day.

The Structure of the Substance

The name cellulose indicated the organised structure of the substance, which was usually found in the form of fibres in the vegetable world; and no study of the chemistry of this product would be complete without an adequate examination of its physical properties also. It was, indeed, a colloid, and most of its industrial uses depended on its fibrous or colloidal nature. Analysis revealed the empirical formula as $C_6H_{10}O_5$, but as the molecular weight was exceedingly large this had to be multiplied by an unknown factor x. In each of these simple residues there were three free hydroxyl groups which took part in the esterification processes known as nitration, leading to nitro-cellulose or gun cotton; and acetylation, with the formation of cellulose acetate (silk and films). Similarly a trimethyl cellulose was known. In the presence of alkali, cellulose combined with carbon disulphide to give a xanthogenate, soluble in water, which represented the first stage in the process of the manufacture of viscose silk; whilst the complete solubility of cellulose in cuprammonium solutions afforded still another method by which extruded filaments of pure cellulose could be obtained. On complete hydrolysis with dilute sulphuric acid cellulose was converted almost completely into glucose. Another simple method by which cellulose could be degraded was acetolysis, which converted cellulose to the extent of 30 per cent. into cellobiose. Workers in the Birmingham laboratory had recently advanced experimental proof of a new formula for glucose, representing it as a substituted amylene oxide—*i.e.*, a six-membered ring containing five carbons and one oxygen, coupled with other addenda. The constitution of cellobiose had also been definitely determined by research workers who were present at that meeting.

Position of Glucose in the Molecule

Here, then, they had valuable information which served as a preliminary to the new effective study of the constitution of this polysaccharide. It followed that the linkages with the other residues must involve the first and fourth carbon atoms of $C_6H_{10}O_5$ units, but even with the problem simplified to this degree several modes of combination to give a complete cellulose molecule were possible, and various workers, on the basis of their earlier results, had suggested that the cellulose molecule was represented by a repetition of cellobiose units joined to give either a cyclic form or long extended chains, but the experimental basis for these assumptions was lacking.

Recent work by Hess had given rise to the conception that the linkages between one glucose residue and another were effected by residual valencies, and not by principal valencies. It must, however, be confessed that at present they knew little experimentally on the subject of residual valencies, and on the whole it seemed an inadequate representation to suggest that so stable a substance as cellulose should be built up on this plan. Indeed, from work recently done in the Birmingham laboratory it would appear that in the simplest possible case that they could study, principal and not residual valencies were involved in polymerisation of simple to higher molecules, a conclusion which was also reached in the valuable work of Staudinger.

Fortunately, the chemist had at hand a valuable instrument of inquiry in the X-ray spectrograph. Knowing the facts so far ascertained as to the constitution of the simplest units, it was possible to utilise these in an interpretation of the X-ray data. Sponsler and Dore had shown that the amylene oxide formula of glucose was in perfect agreement with the requirements of the X-ray measurements. The distance between units agreed with the required length to within 1 per cent. Again, the arrangement of these units in the space lattice corresponded on the X-ray diagram with the intensity of the spacing represented by the actual positions of the carbon and oxygen atoms at their greatest density. The arrangement of the glucose units proposed by these authors differed from that found in the cellobiose structure. They suggested that the linking of the glucose residues occurred through the reducing groups of the 1-position of one pair and the groups of the 4-position of the second pair, and that that arrangement was repeated throughout the whole pattern along the total length of the fibre. That brought the layers of the long chains of glucose units into positions which were consistent with the views derived from plant physiology that concentric layers were successively deposited from within the tube by the protoplasm of the cell. Thus, by combination of the methods of structural chemistry with those available by the use of X-rays, attempts were being made to obtain a satisfactory structure for cellulose.

Bristol Section of the Society

Annual Meeting and Chairman's Address

THE annual meeting of the Bristol Section of the Society of Chemical Industry was held on the evening of Thursday, March 3, Mr. G. Gray presiding. The following officers were elected for the ensuing year: Chairman, Mr. J. Bernard; vice-chairman, Professor F. E. Francis; hon. treasurer, Mr. M. W. Jones; hon. secretary, Mr. A. Marsden. The committee were re-elected *en bloc*, with the addition of Mr. G. Gray.

The chairman, in an address on "Science and Industry," said he believed that in the future it was only the industry built on a more scientific foundation that would continue to prosper. Others would be swallowed up by the competition which their apathy was certain to attract. Up to the present the chemist had shown too little appreciation of the value of his scientific training in formulating methods of control in industry. Matters had been left mainly in the hands of the accountant, who must necessarily base his scheme on accountancy methods, unless he was given the help and co-operation of the chemist. It was the duty of industry to associate itself more closely with pure research work, and, whilst results could not be expected to provide an immediate commercial return, they must undoubtedly provide an insurance for the future, yielding a high return to industry in years to come.

British Cyanides Co., Ltd.

Drastic Reduction of Capital

ON Tuesday, in the Chancery Division, Mr. Justice Eve had before him a motion for the sanction of the Court to a reduction of capital of the British Cyanides Co., Ltd., from £400,000 to £118,725.

Mr. Gordon Brown, for the company, said it was proposed to write off 10s. from each of the £1 preference shares and 18s. from each of the £1 ordinary shares. He admitted that it was a drastic reduction. The company manufactured chemicals, chiefly ferrocyanides used in the manufacture of prints, and this was exported to America. Now that the import duty in America was high, the plant was useless, and could not be used for anything else. The company was engaged in a new process, which it was believed would lead it to success. The rights of the preference shareholders were preserved.

Counsel read an affidavit explaining how the losses arose, and it appeared that the loss was due to the import duty in the United States being increased on this class of manufactured article. This involved very heavy loss on the manufacturers.

His lordship sanctioned the reduction.

Annual Meeting of Analysts

Mr. Bolton's Presidential Address

THE annual general meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, on Wednesday, March 2.

The following were elected as officers and council for the year 1927:—President: E. R. Bolton; past presidents, serving on the Council: L. Archbutt, A. Chaston Chapman, Bernard Dyer, P. A. Ellis Richards, A. Smetham, G. Rudd Thompson, E. W. Voelcker, J. A. Voelcker; vice-presidents: R. L. Collett, C. H. Cribb, J. White; hon. treasurer: E. Hinks; hon. secretary: F. W. F. Arnaud; members of council: L. K. Boseley, H. E. Cox, J. Evans, J. Golding, J. T. Hewitt, H. T. Lea, E. K. Rideal, W. H. Roberts, E. H. Merritt, W. H. Simmons, M. S. Salamon, J. Wood.

The President, Mr. E. R. Bolton, F.I.C., delivering his annual address, gave a blessing to the new Preservatives Regulations, which, he said, placed both the public analyst and the manufacturer in a much happier position than they were in before, because they prevented an unreasonable analyst from extremes of unreasonableness, and confined each and every manufacturer within limits beyond which his competitors could not reap an unfair advantage without risk of punishment. He complimented the free press, which by its habit of continually depreciating their actions spurred them on to better things; but he warned them not to be led astray by alarming articles magnifying a few cases of adulteration, thus causing the public to think that it lived in the year 1820 when Accum wrote "Death in the Pot." He gave figures to show how the adulteration of food was steadily decreasing, which he attributed partly to the activity of the authorities, and partly to the efficiency of the public analysts. He urged the manufacturers to avail themselves of the services of a chemist to maintain the purity of their products and advise them in order to enable them to avoid any contravention of the law. Finally, he gave it as his opinion that the food of the country was never in a purer state than it was at the present time.

An ordinary meeting of the Society then followed. Certificates were read for the first time in favour of:—A. G. J. Lipscomb, B.Sc., A.I.C.; W. L. Matthews; S. J. Rogers, B.Sc., F.I.C.; E. F. Waterhouse; H. W. Webb; A. S. Wood, M.Sc., Ph.D., A.M.I.Chem.E., F.I.C. Certificates were read for the second time in favour of:—W. G. Carey, F.I.C.; W. F. Elvidge, B.Sc., A.I.C.; L. S. Fraser, B.Sc., A.R.C.Sc., A.I.C.; F. P. Hornby, B.Sc., A.I.C.; G. R. Lynch, O.B.E., M.B., B.S., D.P.H.; E. C. Martin; G. G. Philip. The following were elected members of the Society: S. Greenberg, F.I.C.; F. C. Ray, M.A., F.I.C.; and G. C. Matthews, B.Sc., A.I.C.

Detection of Butter Substitutes

A paper on "Cacao Butter Substitutes and their Detection" was read by A.W. Knapp, J. E. Moss, and A. Melley, who stated that the most useful single test was the determination of the "titre" of the fatty acids, and, in the absence of certain other fats (*e.g.*, coconut oil), this test enabled the amount of Borneo tallow in admixture with cacao butter to be approximately determined after reference to a curve. A new method of determination was based on the fact that the green colour of Borneo tallow was not bleached by ultra-violet light, whereas the yellow colour of cacao butter was readily bleached. A weighed quantity of the fat was exposed for six hours to the rays of a standardised quartz mercury vapour lamp, and the colour then compared with the colours of a set of standards containing definite amounts of Borneo tallow.

Illipé Butter in Chocolate

"The Determination of Illipé Butter in Chocolate" was discussed by H. W. Bywaters, F. T. Maggs, and C. J. Pool. The method was based on the fact that melted illipé butter became turbid at a much higher temperature than cacao butter, and that the turbidity temperature determined under definite conditions was practically constant for different specimens of the two fats. The method enabled the amount of illipé butter in a mixture of the two fats separated from chocolate to be determined with a fair degree of accuracy. If a third fat (*e.g.*, milk fat) was also present, the percentage of illipé butter might still be found by reference to a curve, provided that the amount of the third fat could be ascertained.

The Determination of Saccharin

Messrs. A. F. Lerrigo and A. L. Williams contributed an account of "A Study of the Determination of Saccharin, Colorimetrically and by the Ammonia Process," the work having been done under the Analytical Investigation Scheme. The authors had studied five colour reactions of saccharin under variable conditions, and found that none of them gave quantitative results. On the other hand, the ammonia process (in which saccharin was converted into the ammonium salt of sulphobenzoic acid, the ammonia in which was determined by distillation) had been adapted to the determination of small quantities of saccharin.

Anglo-French Industrialists

Resolutions of London Conference

ON Monday and Tuesday last a conference took place in London between leading industrialists representing France and Great Britain. The British representatives were as follows: Sir Max Muspratt, Bart. (president, F.B.I.), Sir Vincent Caillard (President, F.B.I. 1918–19), Colonel the Hon. F. Vernon Willey (President, F.B.I. 1925–26), Mr. H. W. Lee (Fine Cotton Spinners and Doublers), Mr. Clive Cookson (Vice-President, F.B.I.), Mr. W. J. U. Woolcock (Association of British Chemical Manufacturers), Mr. W. A. Lee (*Mining Association of Great Britain*), Mr. F. A. Hargreaves (Chairman, Cotton Spinners' and Manufacturers' Association, Manchester), Mr. F. Holroyd (President of Federation of Master Cotton Spinners' Association, Ltd., Manchester), Lord Gainford, Colonel R. K. Morcom (Chairman, *British Electrical and Allied Manufacturers' Association*), Mr. D. N. Dunlop (British Electrical and Allied Manufacturers' Association), Mr. Henry Bond (President, National Federation of Iron and Steel Manufacturers), Sir W. J. Larke (National Federation of Iron and Steel Manufacturers), Mr. H. J. Ward (President, *British Engineers' Association*), Mr. D. A. Bremner (British Engineers' Association), and Colonel O. C. Armstrong, D.S.O. (ex-President, F.B.I.).

On the other side, M. Duchemin, the President of the General Confederation of French Producers, is also President of the Union of French Chemical Industries. He was accompanied by, among others, M. Gounoud, who is the Vice-President of the Union of Chemical Industries, and M. Roché, the President of the Syndicate of Special Chemical Industries. Of these three French delegates, it is interesting to note that M. Duchemin is a descendant of Cobden, that the grandfather of M. Gounoud lived in England for some years, and that M. Roché is interested in chemical industry in this country as well as in France. Taking it altogether, there was a distinct chemical flavour in all the discussions and a feeling that the Key Industry was taking its proper place.

Text of Resolutions

Among the resolutions passed were the following:—

"That the conference is of the opinion that: (1) While international industrial agreements do not provide a panacea, in many industries they can play a valuable part in expediting the re-establishment of international trade; (2) the conference is of the opinion that the initiative in such agreements can only come from the different industries concerned, and that conferences between the industries of a similar character in different countries should be encouraged; (3) the conference is of the opinion that no action by national Governments or by any international authority can assist, and would be most undesirable as tending to impede the progress of international co-operation in this sphere."

"That, while it is desirable that production statistics should be collected wherever possible, and that these statistics should be interchanged with any other countries who can, and will, provide similar statistics in return; they are of the opinion that the procedure in the first instance should be one of voluntary interchange between organisations representing the same industries in different countries, and that the time is not yet ripe for international action by the League of Nations or any similar organisation."

"The conference is convinced of the value of international co-operation on industrial and economic problems, believes that such co-operation can best be obtained through the consultation of the responsible industrial organisations in the different trades and different countries, and recommends

to the organisations which it represents that they should use every effort to promote and facilitate such consultation."

Following the conclusion of the conference a luncheon was given by the Anglo-French Luncheon Club, at which Sir Alfred Mond presided.

The Future of Chemists

To the Editor of THE CHEMICAL AGE.

SIR,—Having read "Observator's" remarks with interest, also the account of the speech of Professor G. G. Henderson, retiring President of the Institute of Chemistry, with close attention, your invitation prompts me to offer a contribution from another viewpoint.

In very truth, we are living in a chemical age, and chemistry has become one of the most important, if not the most important, professions or industries in the kingdom, and its scope is ever widening. Outside the profession or industry we find chemistry included in the curriculum of the secondary school and in many cases even in the elementary school. The significance of this should be apparent to all interested in chemistry for their livelihood. The remarks of "Observator" sum up the position inside the industry or profession.

Professor Henderson's reference to the practice of restriction as exemplified by the Medical or the Law Society seems to me to be an unfortunate analogy. He is certainly in error regarding the restrictions of trade unions, who operate to safeguard and improve rates of wages or salaries, hours of labour and conditions of employment—more necessary in the chemical industry, with its dangers and diseases, than almost any other. Restrict entry to the profession of chemistry and at once the class barrier is set up, and the day the class barrier goes up the class war starts. This is a truism proved again and again.

No, sir, the day is past for mediæval restrictions of the medical and legal kind being successfully applied to chemistry. I am, however, certainly of opinion that the time has come, if it is not overdue, for a definite qualification standard for the chemist. But matriculation for that qualification must be wide open as the highway and free to all, whether he be the graduate from the college or university or the process worker from the chemical factory frugally and laboriously working to raise himself to a higher position by merit, ability and, maybe, genius, as did that great master Michael Faraday.

It seems to me that there is no great divergence of opinion regarding the necessity of chemical qualification degrees of varying grades. From Professor Henderson's remarks it would appear to be the policy of the Institute of Chemistry. Every responsible person in the chemical industry one talks with agrees that such a qualification should be set up. That being so, why not a joint commission of responsible representatives from the several associations and organisations interested in the chemical industry and profession, including the Institute of Chemical Engineers, who are in close affinity, and appear to be moving along parallel, but solitary and somewhat futile lines? This suggested chemical commission should be thoroughly representative of the whole profession and industry, including the Chemical Workers' Union, who include qualified chemists as well as other grades of workers, and represent nearly all organised workers in the industry.

The chemical commission would work out and draft a definite empirical formula, to use a chemical term, and such would become the basis for an application for a charter. If thoroughly drafted and backed wholeheartedly by the associations and organisations covering the British chemical industry, then the next year or so should see the whole question carried to completion and the British chemist and chemical worker honourably recognised and his status defined in the constitution of the country.—Yours, etc.

T. WILSON COATES,
Northern Organiser, National Chemical Workers' Union.

To the Editor of THE CHEMICAL AGE.

SIR,—The temper of "Observator's" letter is admirably well balanced, and such a spirit as his is one which will help forward the work of organisation and co-operation which everyone desires.

As your correspondent observes, the British Association of Chemists could provide information of an illuminating kind regarding salaries, but the matter is not so serious as many suppose. The Association recommends definitely that a minimum salary of £350 be paid to qualified chemists, and it is surprising how the opinion among employers is spreading that it is false economy to underpay the chemist. Too many unfortunate exceptions are still to be found, but it remains true that, despite depressed conditions, matters improve.

This, however, is a detail beside the large issue which your correspondent raises. Chemists must, as he says, bring their schemes to earth. The Association is, as he truly observes, hampered by the comparative smallness of its numbers, and can we be amazed at it when so much time is wasted, so much unprofitable bitterness expended, as in the recent correspondence to which he alludes, and which he so justly deplores? The time, however, certainly is ripe for discussion of the greater issues, but a beginning in that direction has already been made. The Congress of Chemists last year was that beginning, and it will not be the last.

The British Association of Chemists ought to have at least 7,000 members instead of something less than 1,100. Its place in the scheme of unity can best be made clear by an illustration. The several societies of chemists are like parallel lines all pointing in the same direction but incapable of meeting. The British Association of Chemists is the vertical line which can, and one day will, join them all together.—I am, etc.,

HY. T. F. RHODES,
General Secretary, British Association of Chemists.
"Empire House,"
175, Piccadilly, London, W.1.

Chemical Matters in Parliament

Beet Sugar Subsidy, Number of Workers, Etc.

Mr. Guinness, Minister of Agriculture (House of Commons, March 2), replying to Mr. Thurtle, said that the total amount of subsidy on sugar and molasses received by the British beet sugar manufacturers in the manufacturing season 1925-26 was £1,124,207, and in the season 1926-27 up to February 28, 1927, was £3,041,083. The number of persons employed in the factories in the 1925-26 season was 4,613, and in the past season 7,194. The length of the manufacturing season was, approximately, 100 days.

Pollution by Beet Sugar Effluent

In replying to a further question by Mr. Thurtle, Mr. Guinness stated that he was aware of the pollution which had been caused by beet sugar factories in the eastern counties and elsewhere, and at his instigation the manufacturers appointed an expert to visit all the factories, to report upon the arrangements for disposal of effluents, and to indicate the lines of investigation along which it might be hoped that adequate methods of treatment might be discovered. The expert was at present engaged upon his report. In the meantime, arrangements had been made with the Department of Scientific and Industrial Research for certain investigations to be set on foot at the Rothamsted Experimental Station, by means of which it was hoped that the solution of some of the fundamental problems underlying the difficult question of the treatment of beet sugar effluents might be advanced.

Purification of Chemicals

Major Crawfurd (House of Commons, March 8) asked the President of the Board of Trade if he treated manufacturers who purchased imported chemicals of technical or commercial quality and purified them as being manufacturers of the purified or B.P. quality, the manufacture of which was protected under Part I of the Safeguarding of Industries Act, 1921; and, if not, would he direct his Department to grant exemption orders against all applications where such a position arose?

Sir P. Cunliffe-Lister said that no application had been made to him, under Section 10 (5) of the Finance Act, 1926, which involved consideration of the particular point referred to. If, and when, such an application was made, it would be dealt with on its merits.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

32 (*Silicon*).—A subscriber wishes to be put in touch with a manufacturer of silicon (commercial, lump).

From Week to Week

THE GENERAL ELECTRIC CO., LTD., announce that the address of their Sheffield branch is now "Magnet House," Fitzalan Square, Sheffield.

MR. C. E. BARRS, F.I.C., will speak on "The Works Chemist," at a meeting of the London Section of the Institute of Metals on March 17, at the rooms of the Society of Motor Manufacturers and Traders, 83, Pall Mall, S.W.1.

SCOWEN, CLARK AND CO., 58, Gracechurch Street, London, E.C.3, announce that they have taken over the sole distribution for the United Kingdom and British Colonies of sodium sulphide, solid conc., broken 60 to 65 per cent. and 30 to 32 per cent. grades produced by the S/A de Produits Chimiques de Droogenbosch, Ruysbroeck, lez Brussels. They add that this concern is not in the cartel of continental producers, and is in a position to supply regular shipments on competitive terms.

THE NITRATE PRODUCERS' ASSOCIATION reports that during the past week the sales of nitrate of soda amounted to 86,085 metric quintals. Total sales of the fertiliser for delivery during the current season to date are now 10,380,047 metric quintals. Shipments last month totalled 1,715,941 metric quintals, of which 685,073 metric quintals were exported to Europe and 727,386 to the East Coast of the United States. Exports of nitrate by non-associated producers in the period July 1, 1926, to January 15, 1927, amounted to 456,801 metric quintals.

THE LONDON AND SOUTH-EASTERN COUNTIES SECTION of the Institute of Chemistry will hold its next meeting on Wednesday, March 16. The following motions with regard to the policy of the Institute will be discussed:—(1) "That in future the annual general meeting of the Institute be held at some reasonable hour in the evening"; (2) "That owing to the anomalies that arise from the present system of election to the Council, the Council be asked to reconsider the advisability of electing its members by district alone"; (3) "Adjourned discussion concerning relation of Associateship to Fellowship."

RECENT WILLS INCLUDE: Mr. Frederick Whowell, of Tottington, Bury, calico bleacher, late of Charles Whowell, Ltd., a managing director of the Bleachers' Association, Ltd., and a director of La Reforma Mines of Mexico, Ltd. (net personalty £63,818), £103,975.—Mr. Allin Cottrell, lecturer in manufacturing chemistry, of Edinburgh, £4,351.—Mr. Harold Alexander Falconer, of Bombay, formerly of Aberdeen, of Bell's United Asbestos Co., Ltd., London, £2,572.—Dr. Joseph John Acworth, of Shootup Hill, Cricklewood, photographic chemist, founder of the Imperial Dry Plate Co., who died January 3, aged 73, £562,026 19s.—Mr. John Benn, of Thornbury, Bradford, for many years manager of the late firm of Joseph Brooke and Co., and later on the staff of Naylor, Jennings and Co., Ltd., dyers and finishers, of Yeadon, £2,228.

APPLICATIONS ARE INVITED for the following appointments: Director of Research to the British Cotton Industry Research Association. £2,000. The Secretary of the Association, Shirley Institute, Didsbury, Manchester. March 21.—Director of Research into the Prevention of Water Pollution and Cognate Problems for the Department of Scientific and Industrial Research. £1,200. The Secretary of the Department, 16, Old Queen Street, London, S.W.1. March 31.—Assistant Chemist in the Fruit and Vegetable Preservation Research Station of the University of Bristol. £300, plus bonus and superannuation allowance. The Resident Director, The University of Bristol Research Station, Campden, Gloucestershire. March 14.—Chemical Assistants for the Public Health Department of the London County Council. £244. The Clerk of the Council, The County Hall, Westminster Bridge, London, S.E.1. March 25.—Chemist and Metallurgist in the Egyptian Government Assay Office, Cairo. £718. The Chief Inspecting Engineer, Egyptian Government, 41, Tothill Street, London, S.W.1.

THE MINISTRY OF HEALTH DEPARTMENTAL COMMITTEE on the Treatment of Flour with Chemical Substances, which was appointed in June, 1924, has issued its report. Among the recommendations it is stated that, "while we consider that a staple and indispensable foodstuff, such as flour, the purity and wholesomeness of which are of cardinal importance to the community, should be jealously guarded against unnecessary treatment with foreign substances, we are not prepared on the present knowledge available to recommend the complete elimination of the bleaching agents and improvers now in use. Our view is that in the first instance it should suffice to limit the use of these substances to those which appear least open to objection when judged along the lines we have indicated. We think that chlorine nitrogen, tri chloride and benzoyl peroxide should not be amongst these." It is recommended that makers of chemical improvers should be compelled to tell purchasers what these improvers contain. An appendix of substances recommended as improvers by the National Association of British and Irish Millers, Ltd., is given. These comprise: extracts of malt and germ.; acid phosphate of calcium; acid phosphate of ammonium; persulphates; chlorine; bleaching with nitrogen peroxide; nitrate as sodium nitrate in bleached flour. The limits and the use of these substances are indicated.

AN IMPERIAL AGRICULTURAL RESEARCH CONFERENCE will be held in London in October. Delegates from all parts of the Empire will attend.

TAYLOR'S (CASH CHEMISTS) TRUST, LTD., opened its subscription list during the week for 400,000 £1 7½ per cent. preferred and 400,000 1s. deferred shares. The issue was over-subscribed.

CAMERON, WARNOCK AND CO. announce that owing to the extension of their business they are removing to 105, West George Street, Glasgow (T.N. Central 1580-1; T.A. "Byproduct," Glasgow).

SIR JOHN BRUNNER, of the United Alkali Co., Ltd. and I.C.I., was present at the National Liberal Club luncheon on Wednesday, and gave an address on "Coming Constitutional Changes," emphasising the importance of proportional representation and the single transferable vote.

WILLIAM LAYBURN, of Huddersfield, caught his clothing in the machinery while he was oiling some shafting on Monday at the works of L. B. Holliday and Co., Ltd. He was whirled round the shafting and sustained a double fracture of the right leg and severe internal injuries. He was detained at the Huddersfield Royal Infirmary.

IN THE NOTES ON THE EXHIBITION of the Woollen and Worsted Research Association at the Science Museum, published in the last issue of THE CHEMICAL AGE, mention was omitted of the fact that Mr. A. T. King, B.Sc., F.I.C., chief chemist to the Association, was responsible for the research work illustrated in the Chemical Section. The work on the sulphur content of wool, described in the notes, was carried out under the direction of Mr. King by Mr. J. Barritt, his senior assistant.

JOHN S. GRAY, baker, of Princess Street, Luton, was on Wednesday fined £10 on four summonses for selling bread other than Hovis as Hovis. He pleaded that there was no intention to defraud, and that if a wholemeal loaf was sold for Hovis it was a mistake. Evidence was given as to the purchase of Hovis flour by the defendant, and as to two loaves described on written receipts as Hovis being purchased at his shop. Mr. Horatio Ballantyne, consulting and analytical chemist to Hovis, Ltd., said the loaves were of wholemeal flour, and the percentage of nitrogenous compounds and fats was very low as compared with genuine Hovis.

THE SAVILLE SHAW MEDAL was presented to Mr. T. G. Pearson, a student of Armstrong College, for research work upon the subject of "The Action of Sulphuretted Hydrogen upon Monohydrated Ferric Oxide," at a meeting of the local section of the Society of Chemical Industry on Thursday, March 3. This medal is presented annually to the student of Armstrong College who has performed research work of especial merit in metallurgy or chemistry. After the presentation of the medal, Mr. Pearson read a paper upon his work. A second paper was read by Mr. G. M. Nave, B.Sc., entitled "Apparent Specific Gravity and Porosity: A Comparison of Various Methods."

Obituary

PROFESSOR C. H. WICHELHAUS, on February 28, aged 85, in Heidelberg. He was a well-known teacher of chemical technology and had published numerous books and original papers. Jointly with L. Darmstädter he was the discoverer of the important process of alkali-fusion of sulphonic acids.

DANIEL BERTHELOT, member of the Academy of Sciences and the Academy of Medicine in Paris, aged 61. Son of Marcellin Berthelot, the famous chemist, he himself entered the field of chemical research and won distinction by his activities. After applying himself to the study of physical sciences and working as a laboratory assistant at the Sorbonne, he obtained his diploma as Doctor of Sciences, and in 1884 became Professor of Physics at the Higher School of Pharmacy. He was the author of many scientific memoirs. He studied the general properties of fluids, indicating a method for determining in a rigorous fashion the atomic weights and establishing a new characteristic equation. Afterwards he began to study the physico-chemical actions of light. He measured the chemical activity of ultra-violet rays and succeeded in reproducing phenomena showing the assimilation of light by chlorophyll. In the domain of applied sciences he showed great ability.

PROFESSOR IRA REMSEN, the veteran American chemist, at Carmel, California, aged 81. Born in New York in 1846, of German and Puritan derivation, he graduated at the City of New York College and in medicine and surgery at Columbia University. He became professor of chemistry at Williams College in 1872, and Johns Hopkins University made him Baker professor and director of its chemical laboratories in 1876, secretary of its academic council in 1887, and president and professor emeritus in 1913. He founded in 1879 and edited for many years the *American Chemical Journal*. He published many original contributions to chemistry, saccharine being one of the substances which came to light in his laboratory, and also carried out work having industrial and public bearing. For many years he was president of the American Academy of Natural Sciences, and had received medals and other honours from many scientific bodies in Europe and America. He was the author of a number of books on chemical subjects.

References to Current Literature

British

DYESTUFFS.—Lake dyestuffs and their application. A. W. C. Harrison. *J. Oil Col. Chem. Assoc.*, February, pp. 28–39.

GASEOUS COMBUSTION, ETC.—The combustion of complex gaseous mixtures. III. The inflammation of mixtures of carbon monoxide and hydrogen with air in closed vessels. G. B. Maxwell, W. Payman, and R. V. Wheeler. *Chem. Soc. Trans.*, February, pp. 297–310.

The ignition of gases. VI. Ignition by flames. Mixtures of paraffin with air. N. S. Walls and R. V. Wheeler. *Chem. Soc. Trans.*, February, pp. 291–297.

INORGANIC.—The complex chlorides of tervalent molybdenum. W. R. Bucknall, S. R. Carter, and W. Wardlaw. *Chem. Soc. Trans.*, February, pp. 512–521.

The soluble alkaline earth aluminates. H. T. S. Britton. *Chem. Soc. Trans.*, February, pp. 422–424.

WOOL.—The gel structure of wool fibre. A. Shorter. *J. Textile Inst.*, February, 78–81T.

A note on the chemical decomposition of wool at 100° C. J. L. Raynes. *J. Textile Inst.*, January, 46–47T.

United States

CATALYSIS.—The catalytic minimum point. II. M. Bergstein. *J. Phys. Chem.*, February, pp. 178–186.

COLORIMETRY.—Solutions for colorimetric standards. I. M. G. Mellon and F. D. Martin. *J. Phys. Chem.*, February, pp. 161–177.

GENERAL.—The use of X-rays in the discovery of new elements. G. Hevesy. *Chem. Reviews*, February, pp. 321–329.

OILS.—The principal chemical researches on cod liver oil. C. E. Bills. *Chem. Reviews*, February, pp. 425–441.

Deterioration of mineral oils. R. T. Haslam and P. K. Frölich. *Ind. Eng. Chem.*, February 1, pp. 292–296.

ORGANIC.—Polyhydroxyanthraquinones. VII. Structure and synthesis of hydroxyanthrarufin and of rufiopin. S. V. Puntambeker and R. Adams. *J. Amer. Chem. Soc.*, February, pp. 486–491.

Synthesis of compounds similar to chaulmoogric acid. I. G. A. Perkins and A. O. Cruz. *J. Amer. Chem. Soc.*, February, pp. 517–522.

PHOTOCHEMISTRY.—The photolysis of potassium nitrate. D. S. Villars. *J. Amer. Chem. Soc.*, February, pp. 326–337.

The photochemical decomposition of potassium persulphate. II. J. L. R. Morgan and R. H. Crist. *J. Amer. Chem. Soc.*, February, pp. 338–346.

SURFACES.—Dynamic surface tension and the structure of surfaces. O. K. Rice. *J. Phys. Chem.*, February, pp. 207–215.

German

ANALYSIS.—The determination of cellulose by quantitative saccharification. A. Kiesel and N. Semiganowsky. *Berichte*, February 9, pp. 333–338.

The quantitative analysis of rubidium and caesium. L. Moser and E. Ritschel. *Z. anal. Chem.*, January 11, pp. 184–189.

CARBOHYDRATES.—The problem of the structure of the associating lactolides and its significance for the chemistry of the higher carbohydrates. M. Bergman. *Annalen*, February 19, pp. 121–135.

The individual group of amyloses from potato starch. M. Bergman and E. Knehe. *Annalen*, February 19, pp. 141–150.

CATALYSIS.—The catalytic reduction of nitric oxide and oxidation of ammonia. IV. L. Andrissow. *Berichte*, February 9, pp. 536–540.

GENERAL.—The kinetics of the components of Landolt's reaction. A. Skrabal and A. Zahorka. *Z. Elektrochem.*, February, pp. 42–63.

The dependence of free volume on temperature. W. Herz. *Z. Elektrochem.*, February, pp. 76–77.

CELLULOSE.—The X-ray diagram of cellulose hydrate. R. O. Herzog. *Berichte*, February, pp. 600–603.

NEW ELEMENTS.—The detection of ekamanganese. W. and I. Noddack. *Z. angew. Chem.*, March 3, 250–254.

Dwimanganese in platinum ores. O. Swjaginzew, M. Korsunski, and N. Seljakow. *Z. angew. Chem.*, March 3, pp. 256–259.

ORGANIC.—Contribution to the knowledge of the oxidative degradation of glucose. B. Bleyer and W. Braun. *Biochem. Zeit.*, January 11, pp. 105–116.

"Acetonating" with acetone and zinc chloride. H. O. L. Fischer and C. Taube. *Berichte*, February 9, pp. 485–490.

Compounds of divalent oxygen. II. Sodium hydroxyethoxymethylene and carbon monoxide diethyl acetal. H. Scheibler. *Berichte*, February 9, pp. 554–557.

French

ANALYSIS.—The titration of barium ions. R. F. Le Guyon. *Bull. Soc. Chim.*, January 25, pp. 99–101.

GENERAL.—The solubility of some gases in *cyclo*hexanol. G. Couquil. *J. Chim. Phys.*, January 25, pp. 53–55.

The formation of two unstable hydrates of magnesium platocyanides. P. Gaubert. *Comptes Rend.*, February 28, pp. 527–529.

Contribution to the study of the distillation of ternary heterogeneous mixtures. II. The system ethyl alcohol-benzene-water. J. Barbaudy. *J. Chim. Phys.*, January 25, pp. 1–23.

Contribution to the study of ionic equilibria. I. The study of the equilibrium calcium oxalate-dilute hydrochloric acid. M. Auméras, *J. Chim. Phys.*, January 25, pp. 24–49.

ORGANIC.—The preparation of ethoxalyl chloride. R. Barré. *Bull. Soc. Chim.*, January, pp. 47–49.

A new rearrangement of naphthylamine sulphonic acids. A. Wahl and G. Vermeylen. *Comptes Rend.*, February 7, pp. 334–336.

The action of sulphuric acid on perylene. C. Marschalk. *Bull. Soc. Chim.*, January 25, pp. 74–81.

Miscellaneous

GASES.—The determination of pressures of liquefied gases in containers. R. Nitzschmann. *Continental Met. Chem. Eng.*, March, 79–80 (in English).

GENERAL.—The development and properties of initial explosives. A. Bressner. *Continental Met. Chem. Eng.*, March, 81–82 (in English).

The chemical actions of penetrating radium radiation. XVII. The action on nitrogen containing organic compounds. A. Kailan. *Monatshefte*, February 4, pp. 644–658.

War gases, gas protection agents, and their application in peace time. H. Jörg. *Osterreichische Chem. Zeit.*, February 15, pp. 35–38.

ORGANIC.—The decomposition of dibenzoyl peroxide and succinyl peroxide at high temperatures in the absence of solvents. A. F. A. Reynhart. *Rec. Trav. Chim. Pays-Bas*, February 15, pp. 68–71.

The action of methylglyoxal on urea. L. Seekler. *Rec. Trav. Chim. Pays-Bas*, February 15, pp. 77–84.

Aminoderivatives of dinaphthanthracenediquinone. R. Seka and O. Schmidt. *Monatshefte*, February 4, pp. 627–636.

The action of chlorsulphonic acid on phenols. IV. J. Pollak and E. Gebauer-Füllneg. *Monatshefte*, February 4, pp. 537–558.

Glycerophosphoric acids. IV. P. Karrer and P. Benz. *Helv. Chim. Acta*, February 1, pp. 87–91.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

264,916. ANTHRAQUINONE DERIVATIVES. H. A. E. Drescher, W. Smith, J. Thomas, and Scottish Dyes, Ltd., Earl's Road, Grangemouth, Scotland. Application date, July 21, 1925.

It is known that 3-amino-4-chlorbenzoylbenzoic acid can be converted into a chloraminoanthraquinone which was believed to be a single compound. It is now found that this compound can be separated into two isomers, most probably 2 : 3- and 2 : 1-aminochloranthraquinones respectively, by fractional precipitation from sulphuric acid or by fractional crystallisation from concentrated hydrochloric acid or organic solvents. Further the process can be applied to the separation of the pairs of isomers which are obtained by ring closure of other 3-amino-4-substituted benzoylbenzoic acids. The latter can be prepared by nitrating and reducing *p*-substituted benzoylbenzoic acids. When sulphuric acid is used to convert the benzoylbenzoic acid into the mixture of anthraquinone derivatives the solution so obtained can be directly diluted to the correct concentration for the separation of one of the isomers. In general the 2-amino-3-substituted-anthraquinone is less soluble than the 2 : 1-compound and separates first. The crude mixtures of anthraquinone derivatives can also be halogenated prior to the separation process. A large number of examples are given which describe the production of 2 : 3- and 2 : 1-aminochloranthraquinones, 2 : 3- and 2 : 1-aminomethylanthraquinones, 2 : 3- and 2 : 1-aminobromanthraquinones, 1-brom-2-amino-3-chlor- and 1-amino-2-chlor-4-brom-anthraquinones, and dibrom-2- and dibrom-1-aminoanthraquinones. For the separation process there are specified in addition to sulphuric and hydrochloric acids a large number of organic solvents including aniline, nitrobenzene, solvent naphtha, and acetic acid.

265,259. HALOGENHYDRINS. C. L. Long, F. G. Willson, and T. S. Wheeler, the Research Department, Royal Arsenal, Woolwich, London. Application date, October 2, 1925.

These are prepared by absorbing a halogen in pure water in a suitable reaction vessel or device and then treating the solution with an olefine in a second vessel or device. The solution of chlorhydrin is then again successively treated with halogen and olefine and the process repeated until a concentration of about 10 per cent. has been attained. In the case of chlorine the concentration should not exceed about 0·1 gram per 100 c.c. and the reaction temperature should be about 0—20° C. The process can be conveniently carried out by passing the reaction liquid first down a tower in which it is treated with halogen and then down a second tower in which it is treated with an olefine. The liquid is then returned back to the vessel which supplies the halogenating tower. The concentration of the halogenhydrin solution is maintained at approximately 10 per cent. by continuously withdrawing some of it after the treatment with olefine and supplying fresh water. The solution may be treated for the production of anhydrous halogenhydrin by converting it by known methods, for example as in Specification 236,379 (see THE CHEMICAL AGE, Vol. XIII, page 157), into the corresponding oxide and combining this with anhydrous hydrogen halide.

265,252. HEAT TREATMENT OF MATERIALS. C. F. Hammond and W. Shackleton, 28, Victoria Street, London, S.W.1. Application date, September 5, 1925.

The heating of materials, such as is involved in the concentration, distillation, or decomposition of such materials, is effected by passing them over the surface of a hot liquid or molten mass, the latter being heated by a submerged flame burner and the products of combustion being removed at a portion of the surface of the liquid not covered by the said materials. The method is particularly applicable to the concentration of caustic soda solutions, which must not of course come into contact with combustion products containing carbon dioxide, and also to the treatment of oils, tars, sawdust, ores, coal, refuse, etc. An apparatus suitable for the concentration and dehydration of caustic soda is shown in section in figure 1 and in plan in figure 2. The receptacle *a* contains up to the level *xx* molten lead which is heated by a submerged burner *o* inside a circulation tube *b* mounted in a tray device *d*. When the burner is in action the aeration of the metal in the tube *b* causes it to rise over the upper edge of that tube and thence over the tray *d* and so to the lower part of *a* again. The vessel

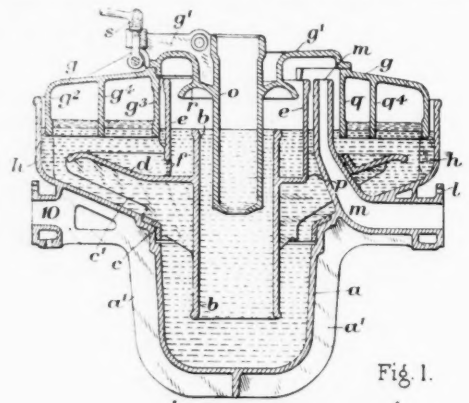
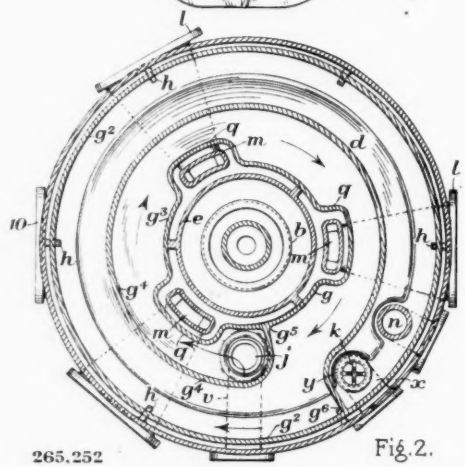


Fig. 1.



265,252

Fig. 2.

is closed by a lid *g* having an outer depending flange g^2, an inner flange g^3 and an intermediate flange g^4, the latter being arranged so as to cause caustic soda solution introduced at *j* to circulate twice over the surface of the lead before leaving the apparatus at *k*. The steam given off from the heated solution leaves by the vent *n* near the outlet *k* and the products of combustion from the burner leave by the passages *mm* and the outlets *ll*; their heat may be utilised in a waste heat boiler for preheating the caustic soda solution.

265,267. CELLULOSE ACETATE. L. A. Levy, 31, Shoot-up-Hill, Cricklewood, Middlesex, and O. Silberrad, the Research Laboratories, Buckhurst Hill, Essex. Application date, August 7, 1926.

This is obtained by treating cellulose, preferably in the air dried condition, with acetic acid and acetic anhydride in presence of chromium and without the employment of a condensing agent such as sulphuric acid. The chromium may be in the form of the acetate, sulphate, nitrate, butyrate, benzene- or naphthalene-sulphonate, chloracetate, carbonate, or hydrated oxide. An example is given in which a chloroform-soluble acetate is produced by boiling the cellulose with acetic acid and anhydride, using chromium acetate as the catalyst.

(*Continued on page* 263)

(Continued from page 262)

265,305. ALKALI CYANIDES. S. Coulier, 31, Rue Ernest Laude, Schaerbeek-Bruxelles, Belgium. Application date, November 7, 1925.

These are produced by passing the gaseous nitrogenous compounds (which may contain free nitrogen) obtained by distillation of nitrogenous organic matter with alkali compounds, over the highly heated alkali-carbon residue obtained in the said distillation. If the materials contain sulphur a desulphurising agent such as metal or metal oxide is added before distillation. The alkali-carbon residue may also be heated under pressure, before treatment with the distillation gases, in order to fix the residuary nitrogen in the state of cyanide. Examples are given of the use of waste leather, animal offal, and sugar-beet vinasses.

265,336. LACTIC ACID AND LACTATES. S. E. Faithfull, 528, Ridgewood Road, West Orange, New Jersey, U.S.A. Application date, December 8, 1925.

The fermentation of partially hydrolysed carbohydrate material for the production of lactic acid is effected in the presence of free oxygen, it being found that this accelerates the formation of lactic acid while hindering the formation of butyric acid; the mash is maintained only slightly acid during the fermentation. A detailed example is given; the fermentation with lactic bacteria is carried out at 112–114° F. with gradual addition of lime, and the mash is then boiled, while still injecting air, to convert into caramel any remaining carbohydrates; the proteins are precipitated by adding lead lactate and the solution of calcium lactate decolorised by means of activated vegetable carbon. Calcium lactate or lactic acid is then isolated from the purified solution in the known manner.

265,375. HYDROCARBONS. Braunkohlen-Produkte A.G., Jägerstrasse 6, Berlin, W.8, K. Bube, Prinzenstrasse 16, Halle a/Saale, Saxony, and E. Erlenbach, Weissenburgerstrasse 62, Berlin, N.58. Application date, February 3, 1926.

Tars, crude creosote oil, shale oil, etc., which are distilled with difficulty in the ordinary way, are converted into useful products by mixing them with heavy hydrocarbons rich in hydrogen, distilling them, and heating the vapours to at least 400° C. in the presence or absence of contact materials such as metallic aluminium or magnesium or other metals. By this means the hydrogen content of the components is equalised. According to an example, generator tar mixed with gas oil rich in hydrogen is distilled and the vapours passed over aluminium turnings at 450–600° C. and then fractionally condensed. From 10,000 kg. tar and 2,500 kg. gas oil is obtained 2,000 kg. light oil boiling up to 150° C., 1,900 kg. boiling up to 210° C., and 3,000 kg. boiling up to 290° C. The latter fraction contains 16 per cent. of cresols. A large quantity of gaseous olefines is also produced.

265,491. BENZYL CELLULOSES. W. Carpmael, 24, Southampton Buildings, London, from I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 1, 1926.

Benzyl cellulose is usually obtained as a tough mass containing benzyl alcohol and benzyl ether which are difficult to remove by solvents. It is found, however, that they can be readily so removed if the benzyl cellulose is first kneaded with a water-soluble metal salt. After extracting the impurities with solvents the salt is then removed by washing with water. The final traces of benzyl alcohol, etc., are then removed by a further extraction of the flocculent benzyl cellulose with solvents. Examples are given.

265,639. ALKALI METAL CYANIDES. Deutsche Gold- und Silber-Scheideanstalt vormals Roessler and H. Freudenberg, Weissfrauenstrasse 7/9, Frankfort-on-Main, Germany. Application date, February 15, 1926.

These are produced by the known process of passing ammonia over a heated mixture of alkali metal and carbon, but the hydrogen produced in the process is washed, dried, and used for the catalytic synthesis of ammonia. The ammonia produced is then utilised in the production of cyanides as before.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to public inspection under the International Convention:—242,975 (Farbwerke vorm. Meister, Lucius, und Brüning), relating to the separation of salts of ammonium and of the alkalis or alkaline earths, see Vol. XIV, p. 82; 249,497 (Soc. of Chemical Industry in Basle), relating to the manufacture of quinolinic anhydride, see Vol. XIV, p. 550; 252,212 (G. Petroff), relating to the production of sulpho-aromatic fatty acids, see Vol. XV, p. 117; 257,259 (Deutsche Gasglühlicht Auer-Ges.), relating to production of titanic acid fast to light, see Vol. XV, p. 433; 261,377 (Chemische Fabrik auf Actien vorm. E. Schering), relating to complex metal alcoholates, see Vol. XVI, p. 91; 262,795 (W. B. D. Penniman and E. J. Shackelford), relating to the decarbonising of ferro-chrome, see Vol. XVI, p. 63 (Metallurgical Section).

International Specifications not yet Accepted

263,826. DYES. Soc. of Chemical Industry in Basle, Basle, Switzerland. International Convention date, December 24, 1925.

It is found that part of the halogen can be split off from polyhalogenated violanthrones and isoviolanthrones by treating them with reducing agents under more drastic conditions than are necessary for vatting them. The products dye cotton from the vat in more reddish shades than the parent material in the violanthrone series and in more bluish shades in the case of the isoviolanthrone series. Examples are given according to which dichlorisoviolanthrone and di- and poly-chlorviolanthrone are treated with caustic soda and zinc dust or hydrosulphite.

263,830. PURIFYING COAL GAS. Soc. Ammonia, Vendin-le-Vieil, Lens, France. International Convention date, December 24, 1925.

This is effected by washing the gas with a large volume of water under high pressure whereby hydrogen sulphide and carbon dioxide are removed as unstable hydrates. The energy of the water issuing from the scrubber is utilised in a Pelton wheel and the water is purified for further use by treating in a tower with an air blast.

263,843. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 29, 1925.

This is a patent of addition to 263,178 and 263,179 (see THE CHEMICAL AGE, Vol. XVI, p. 217). The anthraquinone-thiomorpholines such as are described in those specifications are produced by condensing *o*-aminoanthraquinonemercaptans with alkylenehalides; *o*-aminoanthraquinone-halogenalkylthioethers are first formed but readily lose hydrogen halide forming the thiomorpholines. Examples are given of the production of mono- and di-thiomorpholines from a number of *o*-aminoanthraquinonemercaptans and ethylenebromide, bromchlorethylene, dichlorethylene, and α : β-dichlorhydrin.

263,844. CHLORINATED ALKYLNAPHTHALENES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 29, 1925.

These are prepared by the action of sulphuryl chloride on alkylnaphthalenes at low temperatures, and contain the chlorine in the nucleus. The examples describe the production of 1 : 2- and 1 : 4-chlormethylnaphthalenes, a dichlor-2-methylnaphthalene, and a mono-chlor- and di-chlor-2 : 6-dimethylnaphthalene from the corresponding mono- and di-methylnaphthalenes.

263,845. DYES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 30, 1925. Addition to 248,791.

Specification 248,791 (see THE CHEMICAL AGE, Vol. XIV, p. 527) describes the production of a dioxydibenzpyrenequinone from 2 : 6-dioxynaphthalene-dibenzoic ester. It is found that oxydibenzpyrenequinones can also be obtained by treating Bz2-aroyloxybenzanthrones with acid condensing agents. They dye cotton from the vat in red shades not fast to alkali, but by alkylation products are obtained which dye in yellow shades fast to alkali. Examples are given of the conversion of Bz2-benzoyloxy- and Bz2-*p*-toluyloxybenzanthrone into the corresponding 1-oxy-3 : 4 : 8 : 9-dibenzpyrenequinones and of the methylation or ethylation of the latter. The benzoic and *p*-toluic esters are obtained from Bz2-oxybenzanthrone and benzoyl or *p*-toluoyl-chloride.

263,853. VULCANISATION ACCELERATORS. Grasselli Chemical Co., 1300, Guardian Building, Cleveland, Ohio. (Assignees of I. Williams and W. R. Burnett, Mellon Institute, Pittsburgh, U.S.A.) International Convention date, March 13, 1925.

These are prepared by condensing one molecular proportion of an amino body with two or more, even twenty, molecular proportions of an aldehyde under such conditions that water is eliminated. The amines specified are aniline, *n*-butylamine, ethylamine, *o*-tolyldiguanide, ethylaniline, and ethylenediamine; suitable aldehydes are acetaldehyde, propionaldehyde, *n*-butyraldehyde, heptaldehyde, crotonaldehyde, citral, acetaldol, and α-ethyl-β-propylacrolein. A dehydrating agent or inert solvents may be present. A large number of examples are given.

263,862. HYDRO-CYCLOCAOUTCHOUC. H. Staudinger, 7, Hochmeisterstrasse, Freiburg, Baden, Germany. International Convention date, December 31, 1925.

Cyclo-caoutchouc, which may be obtained by heating caoutchouc in ether or benzene solution for a day at 250° C., is converted into a fully saturated compound by hydrogenation in presence of a catalyst, preferably a metal of the eighth group of the periodic system. According to examples the cyclocaoutchouc is triturated with platinum or nickel or copper oxide and treated in a rotary autoclave with hydrogen at 270° C. and 50–80 atmospheres pressure. The product is soluble in benzene, chloroform, and ether, and may be used as a substitute for guttapercha.

263,877. DEHYDROGENATING ORGANIC COMPOUNDS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 4, 1926. Addition to 262,120.

Specification 262,120 (see THE CHEMICAL AGE, Vol. XVI, p. 167) describes the dehydrogenation of organic compounds with the aid of metal sulphides as catalysts. It is now found that the sulphides may be replaced by the phosphides, selenides, tellurides, antimonides, arsenides and bismuthides of metals such as zinc, cadmium, nickel, cobalt, iron, aluminium, calcium, and magnesium. Examples describe the production of acetone from isopropyl alcohol, isobutyraldehyde from isobutyl alcohol, isobutyronitrile from isobutylamine and *p*-cymene from turpentine.

LATEST NOTIFICATIONS.

266,684. Process for treating acetic acid. Soc. Chimique des Usines du Rhone. February 26, 1926.

266,689. Process for the purification of gases to be used in the production of ammonia. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. February 25, 1926.

266,695. Process for diminishing or preventing loss of carbohydrates in plants when stored. Chemische Fabrik auf Actien (vorm. E. Schering). February 26, 1926.

266,697. Manufacture of tanning agents. I. G. Farbenindustrie Akt.-Ges. February 23, 1926.

266,735. Treatment of crude nitrate of soda (caliche). I. G. Farbenindustrie Akt.-Ges. February 24, 1926.

266,744. Treatment of crude nitrate of soda. I. G. Farbenindustrie Akt.-Ges. February 25, 1926.

266,746. Process for producing solvents and emulsifying-agents. Chemische Fabrik Pott and Co. February 25, 1926.

266,747. Refrigeration processes and apparatuses. Silica Gel Corporation. February 26, 1926.

266,752. Manufacture and production of condensation products of urea and formaldehyde. I. G. Farbenindustrie Akt.-Ges. February 27, 1926.

Specifications Accepted with Date of Application

243,383. Flotation agents for use in concentrating minerals. Barrett Co. November 22, 1924.

243,758. Manufacture of azo dyestuffs and process of dyeing wool therewith. Farbwerke vorm. Meister, Lucius, und Brüning. November 27, 1924.

244,076. Methane, Process for the production of. Chemische Fabrik Griesheim-Elektron. December 3, 1924.

247,946. Increasing the production and phosphoric acid content of Thomas slag. H. Hilbert. February 19, 1925.

249,871. Distilling or cracking hydrocarbons, Process and apparatus for. Gray Process Corporation. March 24, 1925.

255,078. Chromates and manganates, Processes of manufacturing. Compagnie Générale des Produits Chimiques de Louvres, and P. Pipereaut. July 8, 1925.

257,257. Distilling mineral oils, tar, and the like. R. Neumann and L. Steinschneider. August 22, 1925.

264,129. Wet separation of mineral and other pulp, Processes an apparatus for. T. G. Martyn. January 7, 1926.

265,669. Causticising units or apparatus. W. D. Mount. August 12, 1925.

265,679. Continuous filtering and apparatus therefor. W. D. Mount. August 12, 1925.

266,028. Artificial resins, Manufacture of. British Cyanides Co., Ltd., and E. C. Rossiter. November 5, 1925.

266,033. Eliminating phosphorus from pig iron, Process for. P. C. Rushen. (*Gelsenkirchener Bergwerks Akt.-Ges.*) November 12, 1925.

266,040. Precious metals from ores and concentrates, Extraction of. Mond Nickel Co., Ltd., and R. H. Atkinson. November 14, 1925.

266,045. Electrolytic separation of metallic chromium. F. W. Würker. November 16, 1925.

266,097. Purifying and otherwise treating gases, Apparatus for. W. H. Taylor and C. Shaw. January 2, 1926.

266,133. Porous adsorbents, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) February 22, 1926.

266,145. Recovering volatile solvents, Process for. A. L. Mond. (*Metallbank und Metallurgische Ges.*) March 9, 1926.

266,180 and 266,181. Calcium hypochlorites, Manufacture of. S. Urano and S. Imai. May 18, 1926.

266,237. Copper sulphate, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) September 23, 1926.

Applications for Patents

Bachmann, W. Production of active silica acid. 5,571. February 28. (Austria, March 18, 1926.)

British Dyestuffs Corporation, Ltd., and Payman, J. B. Producing wax-like polychloronaphthalenes. 6,159. March 4.

Carpmael, W., and Farbenfabriken vorm. F. Bayer & Co. Manufacture of pharmaceutical products. 5,750. March 1. (November 19, 1926.)

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Azo dyestuffs. 5,889. March 2.

Carpmael, W., and Farbenfabriken vorm. F. Bayer and Co. Manufacture of amino quinclines. 6,167. March 4. (September 7, 1925.)

Chemical Works formerly Sandoz and Ellis, G. B. Preparation of soluble derivatives of meta-aminobenzoic acid esters. 6,160. March 4.

Chemische Fabrik in Billwärder vorm. Hell and Sthamer Akt.-Ges. and Kuhlwein, F. L. Obtaining high grade products from raw coal, etc. 6,209. March 5.

Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies Etablissements Kuhlmann. Manufacture of dyestuffs, etc. 5,749. March 1. (France, March 5, 1926.)

Dartmoor China Clay Co., Ltd. Bleaching clay, etc. 5,607. February 28.

Dicker, S. G. S. and Wiarda and Co. Treatment of manganese ore. 5,745. March 1.

Dupire, A. P. H. Electrolytic apparatus. 6,107. March 4. (France, March 16, 1926.)

Gorrie, E. A. Machine for dyeing, etc., fabrics. 5,806. March 2.

Goskar, T. A. Distillation of carbonaceous materials. 5,751. March 1.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Working with hydrocarbons at high temperatures. 5,966. March 3.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Apparatus for carrying out chemical, etc., processes. 5,967, 5,968. March 3.

I. G. Farbenindustrie Akt.-Ges. Production of condensation products of urea, etc. 5,586. February 28. (Germany, February 27, 1926.)

I. G. Farbenindustrie Akt.-Ges. Production of side-chain bearing aromatic compounds, etc. 5,965. March 3. (Germany, March 3, 1926.)

I. G. Farbenindustrie Akt.-Ges. Photographic objectives. 5,977. March 3. (Germany, March 4, 1926.)

I. G. Farbenindustrie Akt.-Ges. and Staib, K. Converting oxides into anhydrous fused chlorides. 6,220. March 5.

Imray, O. Y. (Allgemeine Ges. für Chemische Industrie). Treatment of hydrocarbons. 5,857. March 2.

Lacell, M. M. Production of metallic magnesium. 6,027. March 3. (France, March 26, 1926.)

Lederer, O., and Stangak, W. Precipitating metal hydroxides. 5,610. February 28. (Czecho-Slovakia, March 9, 1926.)

Mexco, Ltd., and Scott, A. C. Explosives. 6,032. March 3.

Nishigawa, T. Manufacture of ammonium sulphate. 5,747. March 1.

Parker, T. W. Bleaching clay, etc. 5,607. February 28.

Pease, E. L. Manufacture of potassium phosphate, etc. 5,552. February 28.

Pope, P. C. Apparatus for low-temperature carbonisation. 6,005. March 3.

Riedel Akt.-Ges., J. D. Manufacture of hydro-aromatic dicarboxylic acids. 5,555. February 28. (Germany, June 22, 1926.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 12s. 6d. to £5 17s. 6d. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6d. to 6½d. per lb. Crude 60's, 1s. 8d. to 1s. 9½d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 4d. per gall. Steady. 97/99.—2s. to 2s. 3d. per gall. Pale, 95%, 1s. 10d. to 2s. 2d. per gall. Dark, 1s. 9d. to 2s. 1d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 1s. 2½d. to 1s. 3½d. per gall., ex works in tank wagons. Standard Motor, 1s. 11d. to 2s. 4d. per gall., ex works in tank wagons. Pure, 2s. 2d. to 2s. 6d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 11½d. to 2s. 3d. per gall. Firm. Pure, 2s. 3d. to 3s. per gall.

XYLOL.—2s. 3d. to 3s. per gall. Pure, 4s. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 9d.; middle oil, 7½d. to 8d. per gall. Heavy, 8½d. to 9d. per gall.

NAPHTHA.—Crude, 9½d. to 1s. 0½d. per gall. according to quality. Solvent 90/160, 2s. to 2s. 1d. per gall. Solvent 95/160, 1s. 9d. to 1s. 10d. per gall. Solvent 90/190, 1s. 3½d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £8 per ton. Whizzed or hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £11 10s. to £12 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 95s. to 110s. per ton, according to district.

PYRIDINE.—90/140, 9s. 6d. to 13s. per gall. Nominal. 90/180, 7s. 6d. per gall. Heavy, 5s. to 8s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—8s. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7d. per lb. naked at works.

ANILINE SALTS.—7d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4d. per lb.

m-CRESOL 98/100%.—2s. 8½d. per lb.

p-CRESOL 32/34° C.—2s. 8½d. per lb.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—2s. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£75 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—7d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 2d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—7½d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 5s. per ton. Grey, £15 10s. per ton. Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£7 to £10 per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 1s. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—4s. per gall., 60% O.P. Solvent, 4s. 3d. per gall., 40% O.P.

WOOD TAR.—£4 to £5 10s. per ton and upwards, according to grade.

BROWN SUGAR OF LEAD.—£41 to £42 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 5½d. per lb., according to quality, Crimson, 1s. 3d. to 1s. 7½d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—2s. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£46 to £55 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¾d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—5s. 3d. per lb.

ZINC SULPHIDE.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4½d. to 2s. 6d. per lb. Brisk.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. per oz.; 500 oz. lots, 1s. per oz.

ACID, BORIC B.P.—Crystal, £41 per ton; powder, £45 per ton. Carriage paid any station in Great Britain, in ton lots.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—1s. 4d. to 1s. 4½d. per lb., less 5%. Firm.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.

ACID, SALICYLIC, B.P.—1s. 4d. to 1s. 6d. per lb. Technical.—11½d. to 1s. per lb.

ACID, TANNIC B.P.—2s. 9d. to 2s. 11d. per lb.

ACID, TARTARIC.—1s. 1¾d. per lb., less 5%. Firmer.

AMIDOL.—9s. per lb., d/d.

ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.

AMIDOPYRIN.—11s. 3d. to 11s. 6d. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity.

AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: lump, 1s. per lb.; powder, 1s. 3d. per lb.

ATROPINE SULPHATE.—11s. per oz. for English make.

BARBITONE.—8s. 9d. per lb.

BENZONAPHTHOL.—3s. 3d. per lb. spot.

BISMUTH CARBONATE.—12s. 3d. to 14s. 3d. per lb.

BISMUTH CITRATE.—9s. 3d. to 11s. 3d. per lb.

BISMUTH SALICYLATE.—10s. to 12s. per lb.

BISMUTH SUBNITRATE.—10s. 6d. to 12s. 6d. per lb., all above bismuth salts, according to quantity.

BISMUTH NITRATE.—6s. 9d. per lb.

BISMUTH OXIDE.—13s. 9d. per lb.

BISMUTH SUBCHLORIDE.—11s. 9d. per lb.

BISMUTH SUBGALLATE.—9s. 9d. per lb.

BORAX B.P.—Crystal, £24 per ton; powder, £25 per ton. Carriage paid any station in Great Britain, in ton lots.

BROMIDES.—Potassium, 1s. 11d. to 2s. 1d. per lb.; sodium, 2s. 2d. to 2s. 4d. per lb.; ammonium, 2s. 4d. to 2s. 6d. per lb., all spot.

CALCIUM LACTATE.—1s. 4d. to 1s. 5d.

CHLORAL HYDRATE.—3s. 2d. to 3s. 5d. per lb., duty paid.

CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHER METH.—1s. 1d. to 1s. 11½d. per lb., according to sp. gr. and quantity. Ether purif. (Aether B.P., 1914), 2s. 3d. to 2s. 4d., according to quantity.

FORMALDEHYDE.—£39 per ton, in barrels ex wharf.

GUAIACOL CARBONATE.—6s. 6d. to 7s. per lb.

HEXAMINE.—2s. 4d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 12os. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 5d. per gallon f.o.r. makers' works, naked.

HYDROQUINONE.—4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.

IRON AMMONIUM CITRATE B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.

IRON PERCHLORIDE.—22s. per cwt., 112 lb. lots.

MAGNESIUM CARBONATE.—Light Commercial, £33 per ton net.

MAGNESIUM OXIDE.—Light Commercial, £67 10s. per ton, less 2½%; Heavy Commercial, £22 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.

MENTHOL.—A.B.R. recrystallised B.P., 18s. 9d. per lb. net; Synthetic, 10s. 6d. to 12s. per lb., according to quantity; 10s. 6d. for 1 cwt. lots and upwards; Liquid (95%), 12s. per lb.; Detached Cryst., 14s. 6d. per lb.

MERCURIALS.—Red Oxide, 6s. 5d. to 6s. 7d. per lb., levig., 6s. 1d. per lb.; Corrosive Sublimate, Lump, 4s. 3d. per lb., Powder, 4s. 3d. per lb.; White Precipitate, 5s. 1d. per lb., Powder, 5s. 1d. per lb., Extra Fine, 5s. 1d. to 5s. 2d. per lb.; Calomel, 5s. 3d. to 5s. 5d. per lb.; Yellow Oxide, 5s. 10d. to 5s. 11d. per lb.; Persulph., B.P.C., 5s. 1d. to 5s. 2d. per lb.; Sulph. nig., 4s. 10d. to 4s. 11d. per lb.

METHYL SALICYLATE.—1s. 8d. per lb.

METHYL SULPHONAL.—15s. to 15s. 3d. per lb.

METOL.—11s. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 9d. to 4s. per lb.

PHENAZONE.—5s. 9d. to 6s. per lb.

PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—94s. per cwt., less 2½% for ton lots. Dearer.

POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb. for 1 cwt. lots.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot

QUININE SULPHATE.—2s. per oz., 1s. 8d. to 1s. 9d. for 1000 oz. lots in 100 oz. tins.

RESORCIN.—4s. per lb., spot.

SACCHARIN.—55s. per lb.

SALOL.—3s. to 3s. 3d. per lb.

SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.

SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb. B.P.C., 1923—2s. to 2s. 1d. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.

SODIUM FERROCYANIDE.—4d. per lb. carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—77s. 6d. to 82s. 6d. per cwt., according to quantity.

SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.

SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.

SULPHONAL.—10s. to 10s. 3d. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. to 2s. 1d. per lb.

THYMOL.—Puriss., 11s. 6d. to 12s. per lb., according to quantity. Firmer. Natural, 14s. 9d. per lb. Cheaper.

Perfumery Chemicals

ACETOPHENONE.—7s. 3d. per lb.

AUBEPINE (EX ANETHOL).—10s. 3d. per lb.

AMYL ACETATE.—2s. per lb.

AMYL BUTYRATE.—5s. 6d. per lb.

AMYL SALICYLATE.—3s. per lb.

ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL BENZOATE.—2s. 3d. per lb..

CINNAMIC ALDEHYDE NATURAL.—18s. 6d. per lb.

COUMARIN.—10s. 9d. per lb.

CITRONELLOL.—15s. per lb.

CITRAL.—9s. 6d. per lb.

ETHYL CINNAMATE.—10s. per lb.

ETHYL PHTHALATE.—3s. 3d. per lb.

EUGENOL.—9s. 6d. per lb.

GERANIOL (PALMAROSA).—19s. per lb.

GERANIOL.—6s. 6d. to 10s. 6d. per lb.

HELIOTROPINE.—4s. 10d. per lb.

ISO EUGENOL.—13s. 6d. per lb.

LINALOL.—Ex Shui Oil, 12s. per lb. Ex Bois de Rose, 16s. per lb.

LINALYL ACETATE.—Ex Shui Oil, 14s. 6d. per lb. Ex Bois de Rose, 18s. per lb.

METHYL ANTHRANILATE.—9s. per lb.

METHYL BENZOATE.—4s. 6d. per lb.

MUSK KETONE.—36s. per lb.

MUSK XYLOL.—8s. 6d. per lb.

NEROLIN.—3s. 9d. per lb.

PHENYL ETHYL ACETATE.—12s. per lb.

PHENYL ETHYL ALCOHOL.—11s. per lb.

RHODINOL.—28s. 6d. per lb.

SAFROL.—1s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN.—17s. to 19s. per lb.

Essential Oils

ALMOND OIL.—11s. 6d. per lb.

ANISE OIL.—3s. 3d. per lb.

BERGAMOT OIL.—30s. per lb.

BOURBON GERANIUM OIL.—11s. 3d. per lb.

CAMPHOR OIL.—63s. 6d. per cwt.

CANANGA OIL, JAVA.—22s. 6d. per lb.

CINNAMON OIL, LEAF.—6d. per oz.

CASSIA OIL, 80/85%.—8s. 9d. per lb.

CITRONELLA OIL.—Java, 85/90%, 2s. 3d. per lb. Ceylon, pure, 1s. 10d. per lb.

CLOVE OIL.—6s. per lb.

EUCALYPTUS OIL, 70/75%.—2s. per lb.

LAVENDER OIL.—Mont Blanc 38/40%, Esters, 20s. 9d. per lb.

LEMON OIL.—9s. 6d. per lb.

LEMONGRASS OIL.—4s. 6d. per lb.

ORANGE OIL, SWEET.—10s. 6d. per lb.

OTTO OF ROSE OIL.—Bulgarian, 70s. per oz. Anatolian, 30s. per oz.

PALMA ROSA OIL.—9s. 6d. per lb.

PEPPERMINT OIL.—Wayne County, 20s. 9d. per lb. Japanese, 8s. 6d. per lb. Firmer.

PETITGRAIN OIL.—8s. 3d. per lb.

SANDALWOOD OIL.—Mysore, 26s. per lb. Australian, 17s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, March 9, 1927.

BUSINESS has continued fairly active during the week, and there has been little change in the volume of business to report. The only item of interest is the fact that oxalic acid and acetone have been removed from the dutiable list under the Key Industries Act. Export markets have been fairly active.

General Chemicals

ACETONE has been removed from the dutiable list under the Key Industries Act and price continues steady at £58 per ton, ex store.

ACID ACETIC.—There is a good inquiry, especially for export, and prices remain unchanged at conventional figures.

ACID CITRIC.—Price is very firm at 1s. 4d. per lb., and the market is active.

ACID FORMIC is in good request, and price is firm at £47 to £48 per ton.

ACID LACTIC.—Unchanged in price with material in good request.

ACID OXALIC.—This article has also been removed from the dutiable list, but no alteration in price has yet been announced, but the demand continues very active at last quoted figures.

ACID TARTARIC is more active, and price is very steady at 1s. 1d. to 1s. 1¼d. per lb., c.i.f.

ALUMINA SULPHATE is only in moderate request, and price barely steady at £6 5s. per ton, for 17/18 per cent.

AMMONIUM CHLORIDE.—There is a small demand for this material, and the price remains unchanged at £19 10s. to £19 15s. per ton.

COPPER SULPHATE is firm at £24 10s. per ton.

CREAM OF TARTAR.—Has once again advanced, supplies are short, the demand continues good, and it is expected that the price will reach at least £93 to £94 per ton.

EPSOM SALTS are unchanged, and in moderate request at £5 10s. per ton.

FORMALDEHYDE.—Quiet, and unchanged at £42 to £43 per ton.

LEAD ACETATE.—Continues very firm, and active at £44 10s. to £45 per ton for white and £43 for brown.

METHYL ACETONE.—Unchanged at about £60 per ton.

METHYL ALCOHOL.—Unchanged.

POTASSIUM CHLORATE is firm, and in short supply at about 3½d. per lb.

POTASSIUM PERMANGANATE is nominally at 7½d. per lb. for B.P.

POTASSIUM PRUSSIATE.—Still in short supply at 7½d. per lb., and stocks are very light.

SODIUM ACETATE.—Demand remains fair, and price is unchanged at £19 10s. per ton.

SODIUM BICHROMATE.—Unchanged at British makers' figures.

SODIUM HYPOSULPHITE.—Unchanged, although there is a fair amount of Continental competition.

SODIUM NITRITE.—Demand is only fair, and price is nominally unchanged at £19 10s. per ton.

SODIUM PRUSSIATE is extremely firm at 4½d. per lb.

SODIUM SULPHIDE.—Unchanged at British makers' prices.

ZINC SULPHATE is very firm, and in good demand at £14 per ton.

Coal Tar Products

The general tone of the market for coal tar products is decidedly firm.

90's BENZOL is steady at 1s. 9½d. per gallon, on rails, while the motor quality is quoted at 1s. 9d. per gallon, with good demand.

PURE BENZOL is quoted at from 2s. 9d. to 3s. per gallon, on rails.

CREOSOTE OIL is firm, and is quoted at 7¼d. to 7½d. per gallon, on rails in the North, while the price in London is about 8¼d. to 8¾d. per gallon.

CRESYLIC ACID is also steady, at 2s. per gallon, on rails, for the pale quality 97/99%, while the dark quality 95/97% is worth about 1s. 11d. per gallon.

SOLVENT NAPHTHA is quiet, and is worth from 1s. 4½d. to 1s. 5d. per gallon, on rails.

HEAVY NAPHTHA is quoted at 1s. 2d. to 1s. 3d. per gallon, on rails.

NAPHTHALENES are unchanged, the 76/78 quality being worth about £8 5s. to £8 15s. per ton, while the 74/76 quality is worth about £7 15s. to £8 per ton.

PITCH.—There is no change in the position. The price remains 120s. to 130s. f.o.b. U.K. ports.

Latest Oil Prices

LONDON.—March 9.—LINSEED OIL dull, and 5s. to 2s 6d. lower. Spot, £31 15s., ex mill; March to August, £30 15s.; September to December, £31 7s. 6d. COTTON OIL steady and unchanged. Refined common edible, £42; Egyptian, crude, £35 10s.; deodorised, £44. TURPENTINE steady, but quiet, at 6d. to 9d. per cwt. advance. American, spot, 47s. 9d.; April, 48s.; May to June, 49s.; and July to December, 49s. 6d.

HULL.—March 9.—LINSEED OIL.—Naked, spot, £31 15s.; March and April, £31 12s. 6d.; May to August, £31 7s. 6d.; September to December, £31 15s. COTTON OIL.—Naked Bombay crude, £34; Egyptian crude, £35 10s.; edible refined, £39 5s.; technical, £38; deodorised, £41 5s. PALM KERNEL OIL.—Naked crushed, 5½ per cent., £39. GROUNDNUT OIL.—Crushed/extracted, £45; deodorised, £49. SOYA OIL.—Extracted and crushed, £34; deodorised, £37 10s. RAPE OIL.—Crude/extracted, £45; refined, £47 per ton, net cash terms, ex mill. CASTOR OIL and COD OIL unaltered.

Nitrogen Products

Export.—The week has brought little change in the export position. British producers are still selling small quantities on the basis of £10 17s. 6d. per ton f.o.b. U.K. port in single bags. The Far East continues to show interest for prompt shipment, while the usual small inquiries are coming in from certain continental countries and the West Indies.

Home.—Some reports were circulated some time ago that there was a change in the price of sulphate of ammonia. This is quite unfounded. British producers continue selling at £12 6s. per ton for neutral quality, basis 20·6 per cent. nitrogen, delivered to consumer's nearest station. Ordinary quality continues to be sold at £11 16s. per ton, basis 20 per cent. nitrogen, other terms the same as for neutral. On account of the wet weather and floods in several parts of the country the home demand is sluggish.

Nitrate of Soda.—Nitrate seems to be of little interest in the United Kingdom nowadays, as the prices are too high compared with sulphate and cyanamide. On the Continent the merchants are disposing of some of their stocks, and in America quite a good move out is reported.

Calcium Cyanamide

THE trade in this fertiliser is fairly active for immediate use, and numerous inquiries are being received concerning its use for the sugar beet crop. As announced in our previous issue, the price of calcium cyanamide for March is £9 16s. per ton delivered in 4 ton lots, carriage paid to any railway station in Great Britain.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS, ETC.—A firm of agents in Warsaw desires to obtain the representation of British exporters. (Reference No. 246.)

REFINED CAMPHOR, ETC.—A Chilean firm engaged in the manufacture of biological products desire to secure the representation of a British firm of manufacturing chemists and druggists, and to obtain quotations for the sale of "Ovolecitine" and refined camphor. (Reference No. 261.)

ZINC PLATES, TIN AND LEAD.—The Roumanian *Official Gazette* of February 15, published a call for tenders to be received on April 19, at noon, at the General Post Office, Bucharest, for the following materials: 20,000 kgr. zinc plates of 4 mm.; 20,000 kgr. zinc plates of 1·5 mm.; 3,000 kgr. pure tin; 2,000 kgr. lead. (Reference A.X. 4383.)

THE TEXT OF THE POTASH AGREEMENT signed in Paris on December 29, 1926, between the German Kalisyndikat and the French companies, Société Commerciale des Potasses d'Alsace, Mines Domaniales de Potasse d'Alsace, and Société Anonyme de Kali Sainte-Thérèse, is published in full in *La Revue des Produits Chimiques* for February 15. The main points of the agreement have already appeared in THE CHEMICAL AGE.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, March 9, 1927.

DURING the past week business in the heavy chemical market has been moderately good, inquiry both for home and export bringing a fair proportion of orders. Prices on the whole remain steady, exceptions being tartaric and citric acids, which are both firmer.

Industrial Chemicals

ACID ACETIC.—98/100%, £55 to £67 per ton, according to quantity and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—In moderate demand, and quoted price unchanged at about 6d. per lb., delivered or f.o.b. U.K. ports. This price could probably be shaded with firm business in hand.

ACID CITRIC, B.P. CRYSTALS.—Market firm, and only limited quantities on offer at 1s. 4d. per lb., less 5% spot delivery. Offered from the Continent for early shipment for the same figure.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC 80°.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—Price still nominal; 4d. per lb., ex store, but supplies on spot hard to obtain meantime. Quoted 3¾d. per lb., c.i.f. U.K. ports, duty paid.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot supplies limited but some offers round about 1s. 1¼d. per lb., less 5%, ex store.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot material on offer at about £6 per ton, ex store. Quoted £5 8s. 6d. per ton, c.i.f. U.K. ports, prompt shipment from the Continent.

ALUM POTASH.—Lump quality quoted at about £8 7s. 6d. per ton c.i.f. U.K. ports. Crystal powder 5s. per ton less. Spot prices £9 2s. 6d. and £8 10s. per ton, ex store respectively.

AMMONIA, ANHYDROUS.—On offer at 9¾d. per lb., ex store. Containers extra and returnable.

AMMONIA CARBONATE.—Lump £37 per ton; powder, £39 per ton, packed in 5 cwt. casks delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb. delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture unchanged at about £23 to £24 per ton, ex station. Continental on offer at £20 15s. per ton, c.i.f. U.K. ports. Fine white crystals of Continental manufacture quoted £18 10s. per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Rather easier now on offer for prompt shipment from mines at £18 15s. per ton, ex wharf. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £8 per ton, c.i.f. U.K. ports, packed in bags. Casks 7s. 6d. per ton extra. Offered on spot at about £9 12s. 6d. per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers £8 per ton, ex station, minimum 4-ton lots. Spot material 10s. per ton extra. Continental now quoted £7 10s. per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works, or at £4 12s. 6d. per ton. f.o.b. U.K. ports for export.

COPPER SULPHATE.—English material quoted £23 per ton, f.o.b. U.K. ports. Continental on offer at £21 10s. per ton, c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £38 10s. per ton, c.i.f. U.K. ports. Spot material available at about £40 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental now quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material now offered at about £34 10s. per ton, ex store.

LEAD, WHITE.—Quoted £36 per ton, ex store.

LEAD, ACETATE.—White crystals quoted £42 15s. per ton, c.i.f. U.K. ports; brown about £40 5s. per ton, c.i.f. U.K. ports; white crystals on spot quoted £44 5s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

MAGNESIUM CHLORIDE.—Quoted £6 6s. 6d. per ton. c.i.f. U.K. ports.

POTASH CAUSTIC, 88/92%.—Solid quality unchanged at £27 5s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Smaller quantities 15s. per ton extra. Liquid, 50° Be., £14 10s. per ton, c.i.f. U.K. ports, minimum 15-ton lots.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE.—96/98%, quoted £25 15s. per ton, ex wharf early delivery. Spot material available at about £27 per ton, ex store; 90/94% quality quoted £22 10s. per ton. c.i.f. U.K. ports.

POTASSIUM CHLORATE, 98/100%.—Powdered quality on offer at £24 5s. per ton, c.i.f. U.K. ports. Crystals, £2 per ton extra.

POTASSIUM NITRATE.—Spot material on offer at £22 10s. per ton, ex store. Offered for prompt shipment from the Continent at about £21 per ton, c.i.f. U.K. ports.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6¾d. per lb., ex store, spot delivery. On offer for early shipment at 6½d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—In good demand, and price unchanged at about 7½d. per lb., ex store, spot delivery. Offered from the Continent at 7¼d. per lb., c.i.f. U.K. ports.

SODA CAUSTIC.—Powder, 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton; carriage paid station, minimum 4 ton lots on contract. Spot material 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 10s. per ton, ex store. Continental on offer at about £19 per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powder or pea quality, £1 7s. 6d. per ton more; alkali, 59%, £8 12s. 3d. per ton, ex quay or station

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum 4 ton lots. Continental quality offered at £8 per ton, ex wharf, prompt shipment, packed in bags. Casks 10s. per ton extra. Pea crystals, photographic quality, of British manufacture, quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 per ton, ex store. Refined quality 5s. per ton extra.

SODIUM NITRATE, 100%.—Spot material now quoted £20 5s. per ton, ex store.

SODIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the Continent at 4¼d. per lb., ex wharf. Spot material on offer at 4½d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—60/65%, solid, £12 10s. per ton; broken, £13 10s. per ton; flake, £14 10s. per ton; crystals, 31/34%, £8 10s. per ton, and £9 per ton, according to quality delivered buyers' works, minimum 4 ton lots on contract. Price for spot 5s. per ton, extra for solid, 2s. 6d. per ton, extra for crystals; 60/62%, solid quality offered from the Continent at about £9 7s. 6d. per ton, c.i.f. U.K. ports; broken 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 10s. per ton; rock, £11 10s. per ton; floristella, £11 per ton; ground American, £9 15s. per ton. Ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered 20s. per ton extra.

ZINC SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, March 10, 1927.

The slight improvement in the volume of business that is being done in chemical products continues on this market. Most of the buying that is reported is still for relatively small parcels in the majority of cases, but there seems to be a readier disposition to look ahead in many instances and more interest is being shown in forward positions. Taking prices generally, the market here is holding up remarkably well.

Heavy Chemicals

Bleaching powder is still being offered at £8 per ton, and the demand for this is not unsatisfactory. For sulphide of soda current inquiry remains slow, and actual business is on a limited scale, with commercial quality on offer at about £8 7s. 6d. per ton, and 60-65 per cent. concentrated solid at £11. Prussiate of soda keeps fairly steady, and a quiet business is being done at about 4¼d. per lb., or a trifle less. The demand for caustic soda is on a good scale, both on home consumption account and for shipment, at from £14 10s. to £16 10s. per ton, according to quality. Alkali is also well maintained, and meets with a fairly active inquiry at £6 15s. per ton. Saltcake is held at about £3 10s. per ton, with the demand for this on quiet lines. Glauber salts are dull and on the easy side at £3 2s. 6d. to £3 5s. per ton. Phosphate of soda keeps steady and in moderate request at £12 15s. per ton. For bicarbonate of soda the demand is fairly active and values are fully maintained at £10 10s. per ton. Hyposulphite of soda is moving on in small quantities but there is not much change in the price situation, photographic being quoted at about £15 2s. 6d. per ton and commercial quality at £9 15s. Nitrite of soda is held at from £19 to £19 5s. per ton, and a fair trade is reported. Chlorate of soda is moving off only in limited quantities at about 3⅛d. per lb., with bichromate of soda in fair request at about the same figure.

Carbonate of potash continues to meet with a fair measure of inquiry at steady prices, round £26 5s. per ton being quoted here still. Caustic potash is in quiet demand, with values unchanged at £29 per ton. There is still only a moderate business being put through in the case of permanganate of potash, but prices are steady at round 5d. per lb. for the commercial and 6d. for the B.P. material. Chlorate of potash is held at 3⅜d. per lb., but there is only a limited inquiry for this reported here this week. There is some demand for yellow prussiate of potash at in the neighbourhood of 7¼d. per lb., the tendency being slightly less firm than it has been recently. Bichromate of potash is steady and in moderate request at 4⅛d. per lb.

Sulphate of copper is firm at about £24 12s. 6d. per ton, f.o.b., and export inquiry for this remains relatively good. Arsenic is in moderate demand and is now quoted at from £17 to £17 5s. per ton at the mines for white powdered, Cornish makes. There is not much change in the quotations for the lead products, neither has there been any expansion in the demand for these; about £40 per ton is being asked for nitrate, with white acetate on offer at £44 and brown £41. Grey acetate of lime is in rather slow request, but values keep fairly steady, grey being offered at £15 15s. to £16 per ton, and brown quality at £9.

Acids and Tar Products

Although there is not a great deal of business offering in the case of citric acid, prices seem steadier at 1s. 3d. per lb. Tartaric also maintains its recent firmness, about 1s. 0⅛d. per lb. being quoted. Oxalic acid is in fair demand at about 3⅞d. per lb., with not too much on offer. Acetic acid continues to move off in fair quantities, and quotations are well maintained at about £67 per ton for glacial and £37 per ton for 80 per cent. commercial material.

The tar products are quiet on the whole, and the tendency is still easy. For pitch about £4 15s. per ton is now being asked, with buying on rather quiet lines. Carbolic acid crystals are not attracting much attention, but values show little change on the week at about 6d. to 6¼d. per lb. Solvent naphtha is in limited demand at 1s. 6¾d. per gallon. About 7¼d. per gallon is the current value of creosote oil, but there is not much actual business passing in this material, although inquiry shows some improvement.

Damages for Stream Pollution

Discharge from By-product Plant

At Durham Assizes recently Mr. Justice Fraser heard the action brought by Septimus Mawston, of Chilton, who claimed £557 from Pease and Partners, Ltd., owners of Chilton Colliery, for loss of animals that had died, it was alleged, as a result of drinking river water which was polluted by the effluent from by-product works plant at Chilton Colliery. Dr. Geoffrey Martin stated that on February 21 he made an analysis of the stream at four different points. The water was found to be poisonous and likely to cause death to animals. There was no necessity, except convenience, to discharge the effluent into the stream. It could have evaporated. This was done in at least four works in the country. The defence called Professor G. H. Woolridge, of the Royal Veterinary College, London, who said he considered that the matter, as revealed by analysis, was harmless to cattle and horses.

Giving judgment on Saturday, March 5, Mr. Justice Fraser awarded £116 to the plaintiff. The judge found that the water was polluted by the defendants and that the cow which was the subject of a post-mortem examination died by the act of defendants in polluting the water. On that claim he awarded plaintiff £40. With regard to losses in respect of other cows and horses, his Lordship said plaintiff had not satisfied him that the defendants had caused the death of those animals by polluting the stream. Defendants would succeed on that part of the claim. He granted plaintiff an injunction restraining the company from sending any further injurious matter into the stream from Chilton Colliery.

Safeguarding of Key Industries

Board of Trade Announcements

The Board of Trade give notice that representations have been made to them under Section 10 (5) of the Finance Act, 1926, regarding ammonium perchlorate and potassium guaiacol sulphonate. Any person desiring to communicate with the Board of Trade with respect to these applications should do so by letter addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, within two months from the date of this notice (March 9).

The Board of Trade also give notice that the Treasury, by Order dated March 7, 1927, have exempted, under the foregoing provision of the Finance Act, 1926, for a period of twelve months from the date of the order, the following articles from the duty imposed by Section I of the Safeguarding of Industries Act, 1921, as amended by the Finance Act 1926:—

R. acetone; acetone (fermentation); acetone, synthetic; acid oxalic; amidopyrin (pyramidon, dimethyl-amido-antipyrine); barbitone (veronal, malonal, malourea, acid diethyl barbituric, diethyl malonylurea, hypnogen, deba); furfurol; guaiacol carbonate (duotal); methyl sulphonal (diethyl sulphonemethylethylmethane, trional); phenacetin (acetparaphenetidine); phenazone (antipyrine, phenyldimethylpyrazolone, analgesin, anodynine, dimethyl oxychinizin); piperazine (diethylene-diamine, dispermin); pyramidon-veronal; salol (phenyl salicylate); sulphonal.

Chemical Dealers' Voluntary Liquidation

A meeting of the creditors of Direct Drugs, Ltd., wholesale druggists and chemical dealers, of Fishmongers' Hall Street, London, was held on Wednesday, at the offices of the liquidator, 2, Guildhall Chambers, Basinghall Street, E.C. The statement of affairs showed liabilities £774 12s., assets £399 12s. 9d., or a deficiency so far as the creditors were concerned of £374 19s. 3d. The representative of the Association of Manufacturing Chemists pointed out that something like £1,200 had gone in a period of less than nine months, and the liquidator replied that the turnover had been insufficient, having regard to the overhead expenses. A resolution was passed confirming the voluntary liquidation of the company with Mr. Burrows as liquidator, whilst a committee was also appointed consisting of Mr. E. C. Croft, Mr. W. Slater, and Mr. P. S. Booth, of the Association of Manufacturing Chemists.

Company News

PARKES CHEMISTS.—The directors announce the payment on March 20 of a final dividend on the preference shares for the half-year ended February 28, 1927, at the rate of 6 per cent. per annum, less income tax.

SALT UNION, LTD.—A dividend of 2s. 6d. per share is recommended on the ordinary shares of the company, making 12½ per cent. for the year ended December 31 last. The sum of £24,000 is to be carried forward.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS, LTD.—The directors announce that they are recommending, at the forthcoming annual meeting, the payment of a dividend on the ordinary shares of the company of 4 per cent. for the year ended December 31, 1926. This compares with 6 per cent. for the year 1925, against nil for the years 1924 and 1923.

CEREBOS, LTD.—For the year ended November 30 last, the profit amounts to £98,309, as compared with £88,092 for the previous year. There was brought forward from last year £32,022, making available £130,332. A dividend of 20 per cent., free of income tax, is recommended, placing to reserve £30,000, and to staff pensions £10,000, leaving a balance to be carried forward of £30,332. The annual meeting will be held at Newcastle-upon-Tyne on March 16, at 12 noon.

BRITISH CEMENT PRODUCTS AND FINANCE CO., LTD.—The directors, in the statutory report of the company, state that the company has concluded certain important business upon which a substantial profit has been earned. The total amount of shares allotted is 100,000 ordinary shares of £1 each and 100,000 deferred shares of 1s. each. The total amount of cash received by the company in respect of these shares is £101,084. The expenses to February 25, 1927, amount to £11,873, leaving a balance of £89,211.

UNITED TURKEY RED CO., LTD.—The net profit for 1926 amounted to £73,456, compared with £182,732 in 1925, which with £39,671 brought in, makes a total of £113,127. After meeting the preference share dividends, directors recommend a dividend for year on the ordinary shares of 5 per cent., less tax, against 10 per cent., leaving £36,938 to be carried forward. It has not been necessary to make provision for taxation in the year's accounts, as sums set aside in past years are now found to be ample.

INTERNATIONAL PAINT AND COMPOSITIONS CO., LTD.—After writing off bad debts, the profit for the year 1926 amounts to £76,746. Deducting provision for income tax, £14,000, tax deducted from dividends, £8,551, and provision for depreciation, £6,427, there remains £64,871, to which is added the balance from the last year of £13,834, making £78,705. The directors recommend placing to the reserve fund £25,000, a final dividend of 4 per cent. on the ordinary shares, making 7 per cent. for the year, carrying forward £15,105. The annual meeting will be held at 31-32, Grosvenor Place, London, on March 16, at 12 noon.

BRITISH PORTLAND CEMENT MANUFACTURERS, LTD.—The payment of a final dividend, in respect of the year ended December 31 last, of 7½ per cent., less tax, making 12½ per cent. for the year, on the ordinary shares, is to be recommended by the directors at the forthcoming general meeting. The directors will also propose to increase the capital of the company from £2,800,000 to £4,000,000 by the creation of 600,000 additional 6 per cent. preference shares of £1 each, and 600,000 ordinary shares of £1 each, and to offer 280,000 ordinary shares at par to the ordinary shareholders in the proportion of one new share to five existing shares.

INDESTRUCTIBLE PAINT AND STANDARD VARNISH CO.—After charging for repairs and maintenance, making allowance for depreciation of plant, fixtures, etc., writing off bad debts, etc., the net profit for the twelve months ended December 31 last amounts to £21,242, to which is added the balance brought forward of £2,264, making £23,506. The directors recommend transferring to reserve for income tax £3,000, writing down goodwill £2,000, transferring to reserve account £2,500, transferring to depreciation reserve account £5,000, paying a final dividend of 5 per cent., actual, less tax, making 10 per cent. for year, leaving to be carried forward £3,506.

IMPERIAL CHEMICAL INDUSTRIES, LTD.—The statutory general meeting will be held at Winchester House, London, on March 18, at 12.30 p.m. The directors state in their report that the agreement to the fusion of interests on the part of the shareholders of the participating companies has been practically unanimous. The total number of shares of the company allotted to date and credited as fully paid up in respect of the exchange value of the shares of the participating companies whose holders, up to February 22 last, had signified their agreement to the fusion is: 15,470,647 seven per cent. cumulative preference shares of £1 each, 20,915,971 ordinary shares of £1 each, and 18,256,228 deferred shares of 10s. each.

PINCHIN, JOHNSON AND CO., LTD.—The directors state the operations for the year ended December 31 last were satisfactory. The net profit for the year, including £12,000 received as compensation for cancellation of an agreement, was £148,339, which with the balance of £30,519 brought forward from last year, makes a total sum to the credit of profit and loss account of £178,858. After making provision for income tax to April 5, 1927, and the year's preference dividend, the directors recommend a final dividend of 20 per cent. on the ordinary shares, making 30 per cent. for the year, less income tax, placing to reserves £27,000, and carrying forward £30,571. The annual meeting will be held at the Hotel Cecil, London, on March 16, at 11 a.m.

JOSEPH CROSFIELD AND SONS, LTD.—For the year ended November 30 last, the profit was £343,022, to which has to be added the balance brought forward of £55,589, making a total of £398,611. After allowing for preference dividends, it is proposed to pay a dividend on the ordinary shares at the rate of 10 per cent.; placing to general reserve £60,560, and carrying forward £10,551. In the preparation of these accounts the directors have adopted in the profit and loss account the principle of treating the associated companies as branches of the business. All the estimated dividends and undistributed profits which are available for dividend have been brought into the account and provision has been made for all losses of associated companies.

BRITON FERRY CHEMICAL AND MANURE.—The report for the year 1926 states that after providing £8,844 in respect of debenture redemption and charging £3,000 for depreciation, there remains a credit balance at profit and loss account, including balance from previous year, of £5,664. The directors have decided to pay, on March 15, a dividend on the preference shares, less income tax, for 1926 to those shareholders on the books on March 1. The company's business, the report adds, was, in common with that of practically every other manufacturing concern in Great Britain, seriously affected by the coal strike. The industries upon which the company is dependent for the sale of its manufactures were disorganised or entirely closed down for some eight months, with the result that the demand, both for acid and fertilisers, was restricted, and, as a consequence, outputs and profits, as compared with the previous year, show considerable diminution. Since the resumption of ordinary trading conditions a steady expansion in the demand for acid has been experienced.

Tariff Changes

FRENCH TOGOLAND.—The *Journal Officiel* (Paris) for February 19 contains a Decree, dated February 11, which introduces a new tariff of import and export duties for French Togoland. Particulars of the new duties on any goods may be obtained from the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. A further Decree of the same date, published in the same journal, authorises the application of "coefficients of increase" to the new specific duties until December 31, 1928. These "coefficients" are to be revised every six months, and may not exceed 6 in the case of imports and 4 in the case of exports.

ITALY.—The Italian *Gazzetta Ufficiale* for February 17, contains a Ministerial Decree which provides for the increase of the Customs duties applicable to certain goods on importation into Italy. Among the articles affected are the following: Boric acid; chromates and bichromates of potassium, sodium and ammonium; chrome alum; hydrosulphites (not specified in the Tariff) and their derivatives; borax or borate of sodium; chromium sulphate; salts for tanning with a base of chromium; ultramarine; metallic colours in powder or prepared in any way; and decolorising products with a base of vegetable black. The increased duties came into force on February 18. For details concerning these articles the *Board of Trade Journal* for March 3 should be consulted.

THE INTERNATIONAL OIL,
CHEMICAL & COLOUR TRADES

EXHIBITION

to be held at the

ROYAL AGRICULTURAL HALL
LONDON

June 11th to 18th

1927

Do you realise you have an opportunity to exhibit in a complete Exhibition for YOUR trade, which will be visited solely by buyers in YOUR trade.

Apply at once for space to the Organisers

The International Trade Exhibitions Ltd.

Broad Street House, Old Broad Street
LONDON, E.C.2

Telephones: London Wall, 0956-0957
Telegrams and Cables: "Promenade, Ave, London."

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BOOTLE CHEMICAL CO., 11, Queen Street, Liverpool. (C.C., 12/3/27.) £18 7s. 8d. February 4.

ECCLES, John, Dalton Chemical Works, 28, Randall Street, Blackburn, chemical manufacturer. (C.C., 12/3/27.) £32 18s. February 2.

PHILLI-MIRANO (1926), LTD., 39, Groton Road, Earlsfield, chemists. (C.C., 12/3/27.) £17 19s. 8d. January 20.

TAYLOR, J. AND J. AND CO., 3-5-7, Seddon Street, Liverpool, paint manufacturers. (C.C., 12/3/27.) £10 17s. 11d. February 5.

Deed of Arrangement

BARNETT, Henry Charles, trading as H. C. BARNETT AND CO. AND ESTEROL MANUFACTURING CO., Ferdinand Street, Oldham Road, Manchester, chemical merchant. (D.A., 12/3/27.) Filed March 4. Trustee, H. Sharp, 30, Brown Street, Manchester, I.A. Liabilities unsecured, £840; assets, less secured claims, £323.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an—followed by the date of the Summary, but such total may have been reduced.]*

LILY HILL DYEING CO., LTD., Manchester. (M., 12/3/27.) Registered February 26, £2,000 mortgage to Yapps Laundry, Ltd., 922, Chester Road, Stretford; charged on Lily Hill Works, Whitefield (except mines and minerals and plant, etc.).

PADIHAM CHEMICAL CO., LTD. (M., 12/3/27.) Registered February 18; charge to Bank; charged on Station Works, Padiham. *Nil. July 2, 1926.

Satisfaction

JACKSON (THOMAS S.) AND SONS, LTD., Mitcham, varnish manufacturers. (M.S., 12/3/27.) Satisfaction registered February 25, £500, part of amount registered November 9, 1925, and Corner Wharf, Malt Street, Camberwell, released.

London Gazette, &c.

Companies Winding Up Voluntarily

"ANILINE" BRITISH AND EAST EUROPEAN CHEMICAL AND DYE TRADING CO., LTD. (C.W.U.V., 12/3/27.) By special resolution, November 22, confirmed December 8. A. H. Partridge, chartered accountant, of Fincham, Partridge and Co., 3, Warwick Court, Holborn, London, W.C., appointed liquidator.

SHEPHERD (JAMES A.) AND CO., LTD. (C.W.U.V., 12/3/27.) W. Y. Chrystal, 149, West George Street, Glasgow, appointed liquidator, March 2. Meeting of creditors on Tuesday, March 22, at 2.30 p.m., in the Religious Institution Rooms, 200, Buchanan Street, Glasgow.

New Companies Registered

BONNAIRE, LTD., 28, Rathbone Place, Oxford Street, London. Registered March 5. Nom. capital, £500 in £1 shares. To carry on the business of manufacturers of and dealers in essences, vaporisers, liquid soaps and other chemical products, etc. Directors: Mary C. G. Hutcheon and Phœbe Oakes.

WEST OF ENGLAND BEET SUGAR CO., LTD., Sardinia House, Kingsway, London, W.C. Registered March 5. Nom. capital, £1,000 in 950 preferred ordinary shares of £1 each and 1,000 deferred ordinary shares of 1s. each. Beet sugar manufacturers, growers of beet and other crops, producers of and dealers in sugar, molasses, pulp and other products, agricultural chemists, etc.

YORKSHIRE AMALGAMATED COLLIERIES, LTD., Sheepbridge Works, Chesterfield. Registered as a public company on March 7. Nom. capital, £5,000,000 in 4,000,000 ordinary shares of £1 and 5,000,000 deferred shares of 4s. each. To acquire all or any of the preference and ordinary shares of the Denaby and Cadeby Main Collieries, Ltd., the Dinnington Main Coal Co., Ltd., the Rossington Main Colliery Co., Ltd., and the Maltby Main Colliery Co., Ltd., under or in pursuance of a scheme for the amalgamation or partial amalgamation of the said four companies confirmed by the Railway and Canal Commission on March 3, 1927, under the Mining Industry Act, 1926, or otherwise, and to carry on, develop, and extend the businesses of mine owners and colliery proprietors; manufacturers of coke and other products of the carbonisation of coal and of coal briquettes or other patent fuels, chemical manufacturers, refiners, distillers, gas makers, etc. Directors: Lord Aberconway, Sir Henry Norman, Sir C. E. Ellis, W. H. McConnel, W. B. M. Jackson, Major J. Leslie, F. J. Dundas, K. R. Pelly, Colonel H. M. Stobart.

Tar Fumes and Lung Growths

ON Friday, March 4, the Manchester coroner held an inquest on Thomas Henry Critchlow, aged 59, a gas retort worker, of Beswick. It was stated that Critchlow had been employed by the Manchester Corporation at the Bradford Road gasworks for 26 years. His duties consisted in keeping the mains clear of tar and in charging up the retorts after they had been scraped. Critchlow worked a good deal among tar. Dr. N. Kletz, describing the post-mortem examination, said that there was a healed scar on the body of a previous operation for epithelioma, which disease had apparently been completely eliminated. Death was due to a growth on the lung, which was a primary growth, and not connected with the previous disease. He was not in a position to say that the growth on the lung could not have been caused by the inhalation of tar fumes. The coroner said that it might be shown in days to come that growths in the lungs might arise from this cause. It was not sufficiently established as yet, and he proposed to return an open verdict.

Benn Brothers' Other Journals

THE CABINET MAKER.—The Inside of a Mattress: Coilings of Springs, Article No. XXVIII; The Future of Furnishings; Pioneers of Modern Decorative Art; Ideal Home Exhibition: Final Review of Furnishing Stands.

THE ELECTRICIAN.—"Magnetic Storms and Wireless Transmission," by E. V. Appleton; "More Light—Less Cost," by D. J. Bolton; The Economic Production of Steam by Electricity.

THE FRUIT GROWER.—Western Commercial Show (special report and illustrations); "Pigs in Fruit Plantations," by E. M. Bear; Benevolent Society's Record.

GARDENING ILLUSTRATED.—Cultivation of Border Carnations and Pinks; The Garden of H.H. the Prince of Monaco; Selection of Summer Flowering Plants; Seasonable Work in the Kitchen Garden; Gardens at Olympia.

THE GAS WORLD.—Musings on Works Maintenance; Dinner to Sir David Milne-Watson; Preparing Coke for the Domestic Market.

THE HARDWARE TRADE JOURNAL.—The Future of the British Industries Fair: Points that Merit Attention; Technique of Salesmanship; Selling Methods at Exhibitions.

THE TIMBER TRADES JOURNAL.—Home-Grown Timber Trade: Grading and Seasoning; Polish Timber Trade; Arbitration: Some Conclusions.